Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....$5.00
Canada.....6.00
Foreign Countries (excepting daily editions).....8.00
Single Copies.....15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, $1; foreign, $2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,850 copies were printed; that of these 8,850 copies 7,358 were mailed to regular paid subscribers to the weekly edition, 372 were provided for counter and news companies' sales, 973 were mailed to advertisers, exchanges and correspondents, and 147 were provided for new subscription, samples, copies lost in the mail and offic use; that the total copies printed this year to date were 295,000, an average of 9,216 copies a week.

The RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

VOLUME 59 AUGUST 6, 1915 NO. 6

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Stationary Boiler Insurance

For railways to carry some of their own insurance is common practice and in many cases profitable. There is one risk, however, that has been let out almost entirely to the insurance companies, and that is the stationary boiler insurance. One road in the middle west, operating over 540 stationary boilers, has recently investigated this problem, being prompted by the fact that the rates on this class of insurance had materially increased since the time it was last placed. It was found that by far the greater proportion of the premiums paid to the insurance companies was spent for inspection, and that a very small percentage was held for the payment of claims, the theory being that with competent inspection there would be very few claims to pay. Believing that as competent inspectors of boilers could be obtained from the mechanical department of the road as could be provided by the insurance companies, this railroad has decided to assume the entire liability and carry its own boiler insurance. The expense incident to the inspections and the claims are to be carried by the insurance department and no opportunity is left for any charges to be shifted to other accounts. The insurance department will act as an individual outside concern, the profits going to the road itself. The plan is worth the consideration of other railways.

The Selection and Promotion of Men

Railroad officers generally agree that one of the most troublesome problems confronting them to-day is that of the selection of men and their promotion. The article on this subject on another page supplements in a way the one by George M. Basford, which was published in the RAILWAY AGE GAZETTE of July 23, page 150. Closely allied with this subject of the selection and promotion of men is that of the education and training of employees; in fact in a big way it is practically impossible to consider them apart. Because of the importance of these things it would seem not only wise, but necessary, if anything really worth while is to be accomplished, to have them placed in the hands of some officer reporting direct to the chief executive and having full authority and responsibility in matters pertaining to the selection, training and promotion of all of the employees in all departments. That this step would be fully justified is indicated to a degree by the remarkable results which have followed the inauguration of rational apprenticeship systems in the motive power department or of special educational campaigns which have been carried on in other departments of various railroads in recent years. Unfortunately such movements have not been general and in most cases have touched only one or two departments on any one road. The time would seem to be opportune for developing and inaugurating movements of this kind on a larger scale, including every employee of all departments.

Safety First All the Year Round

Why can a railway be run more safely in April and June than in other months of the year? This question is suggested by Mr. Richards, chairman of the Chicago & North Western central safety committee, in a report which was noticed last week, page 209. The same suggestion may be found in the train-accident record for the month of April, printed in the *Railway Age Gazette* of May 21, page 1036. The general fact has been evident from a long series of accident records. There have been many notable train accidents in the United States during the past 20 years, but only three, of the first magnitude, occurred in the month of April. Good weather, a moderate volume of traffic and a minimum number of inexperienced trainmen are three elements in which April often, or usually, has an advantage over the other months of the year. But Mr. Richards appeals quite definitely to the individual officer and the individual employee. He aims to make the matter personal. You cannot control the weather; but can you not take more care to provide against injury to persons or property, when weather conditions are adverse? A moderate volume of traffic tends to make work easy, all around; but why not, in the easy times, train yourself to perform a larger share of your duties automatically, so that when the rush comes on you will not get "rattled"? Knowing the advantages of experience and the benefits from being able to perform all operations with tried men, why not take more pains to instruct new men, systematically? Mr. Richards has opened up a broad subject, one embracing a hundred questions for superintendents, trainmasters, trainmen, and all hands. He is not propounding new problems; but his report suggests the attacking of old ones from a new angle. At his best the engineman, the conductor, the track repairer does everything safely not only in April but in February,

in spite of the cold. At his best he avoids errors and accidents in rush times as well as in slack. Mr. Richards challenges him (and every one) to be at his best all the time.

The Farmer and the Railroad

We publish on another page an article on "The Farmer and the Railroad," which was written by Philip Meinen, a farmer who formerly lived at Hanover, Kan., and who now resides at Stites, Idaho. This article condenses as much common sense on the railroad problem as we have ever met in a similar space. There is so much common sense in it because Mr. Meinen looks at the railroad business just as he looks, and thinks others should look, at the farming business. He believes it is a poor rule that will not work both ways; and applying to the railway business the rule that he believes should be applied to the farming business, he is quite unable to see why those who plant their capital in railroads should not, like a farmer or any other business man, be allowed to reap where they sow and garner a harvest proportionable to the enterprise and skill with which they cultivate their chosen field. In imagination he puts himself in the railway investor's and the railway manager's places, and frankly recognizes how, if he were in their places, he would like to be treated; and having done this, he advocates, in substance, the application of the Golden Rule. The solution of all of our seemingly difficult economic and social problems would be greatly simplified and facilitated if all classes of the people would approach them in this direct, common sense and honest way. The managements of the railways could do much to get other people to treat the railways as they think the railways should be treated by setting the example of dealing always with other people as the railways wish to be dealt with.

THE TRAP CAR DECISION

The hope of the railroads of increasing their revenues by charging for spotting cars and by cancelling tunnel, lighterage and industrial road allowances, held out by Commissioner Harlan and Special Counsel Brandeis, seems to have gone glimmering, along with the charge that they were dissipating their revenues by "free services" and allowances. But the decision in the trap car case really seems to hold forth an opportunity which may be translated into money.

While the commission orders the cancellation of the tariffs filed by the railways as being hastily prepared, ambiguous and discriminatory, its language is such that Commissioner Harlan no longer dissents. He says the opinion "concedes the propriety of a charge for the so-called trap car service in its most typical form." The majority opinion by Commissioner Clements finds that the trap car has come to be an efficient and important instrument for the expansion of both the transportation and the commercial business of the country, and that it is not desirable that anything should be done that will seriously impair its efficiency. But it notes some important distinctions between various classes of trap car service.

"If a consignor orders a car placed on his private track, and there loads it with less than carload shipments and then orders the carrier to transport the car to its local freight or transfer station for rehandling and forwarding of contents," the commission says, "the consignor has used the facilities of the carrier to dray his shipments. The carrier has rendered a service which is special in character and for which it would seem to be entitled to fair compensation, with due regard to the service rendered." This is substantially the position taken by the *Railway Age Gazette*. The commission also says that the same character of service is rendered when a car is held at a local freight or transfer station, then loaded with inbound shipments and transported to an industry side track. But "if a car is loaded with less than carload shipments and is transported between the side track and a transfer point outside the terminal district, on or off the line of the industry carrier, or if the car moves between a gateway and destination, the service at the terminal is not different from that rendered with respect to carload shipments moved from or to the same siding." This service, the commission holds, is not a free service.

These distinctions were not made by the railroads in preparing their tariffs, nor by the shippers in opposing any charge for trap car service, and on the record it is not surprising that the commission should have found it necessary to order the cancellation of the tariffs. Commissioner Harlan adheres to the view that any form of trap car service is a discrimination in favor of the owner of a private side track. The majority decision, however, shows that the railroads will be permitted, even expected, to make a charge where a special service is rendered, in which case the shippers will be guided in their decision between the trap car and the dray by the comparative costs of the two methods, while present practices which have been shown to result in advantage to both the railroad and the shipper will in no way be interfered with.

THE RAILWAYS AND THE MANUFACTURE OF EQUIPMENT

To what extent ought the railways to engage in the manufacture of equipment and supplies? On the ground of economy some of them have gone into this to a very considerable extent during the past few years. Has this been a wise movement? Primarily, the business of a railroad is to manufacture and sell transportation, and because of its semi-public character and the difficulties involved in handling more men than are actually required for the carrying on of its business, it would seem that it ought to confine itself as closely as possible to that business.

It stands to reason that ordinarily a manufacturing concern, specializing on a certain line of material or equipment and competing with other companies for the business, will do better work in turning out a uniform product and in cheapening the processes of manufacture than would the railroad which handles this work more or less as a side issue. The argument is often advanced that the selling cost is eliminated when the material is manufactured by the user. True, it is, and yet not a small part of the railroad passenger traffic revenue is contributed by the railroad supply interests. Then, too, it must be remembered that the railway supply companies have been extremely active and have in many cases done remarkable work in developing better materials and better designs, thus saving the railroads untold sums of money which would have been lost if it had been left to the already overburdened railroad officers to develop and perfect these materials and devices. It should also be remembered that the railroad salesman is in many cases a sales engineer rather than a salesman, as the term is usually understood. In most cases these men are technical experts and their duties are largely along missionary or educational lines. In not a few cases railroad supply companies are spending thousands and thousands of dollars each year in educating the railroads to improve their methods and practices in order that the devices which they sell may be given sufficient care and attention to make them most effective. These men are not only of great value to the railways in this way, but ordinarily their experience and training have been so extensive and so broad that they are continually asked for advice as to practices outside of the particular work in which they are specially interested. In the earlier days these sales engineers were used by one or two of the important supply interests only, but in the past few years a considerable number of companies have developed their sales forces along these lines.

Data would be interesting if it were available regarding the exact part which the designers employed by the locomotive and car builders have played in the development of more efficient and effective equipment. Comparatively few railroads maintain a sufficient corps of expert designers to handle this work in anything but a general way and the builders are largely responsible for many of the most important developments and improvements which have been introduced in both locomotive and car design.

On what basis do the railroads compare the cost of material

manufactured in their own plants with the cost of that purchased from the outside? In a manufacturing plant the overhead charge or burden is accurately calculated. On the railroad, with its multiplicity of interests, this factor is far more difficult to calculate and in most cases is arrived at by some rule based more or less on guesswork or rough estimates. Mechanical department officers were greatly disturbed a number of years ago on the publication of the results of an investigation into the burden or surcharge problem which was made on one of the most important western lines in connection with certain betterment work. This investigation showed that the surcharges in a modern railway repair shop averaged about 60 per cent. of the payroll in the locomotive department and 38 per cent. in the car department. It was found, moreover, that these charges, which covered wages paid for supervision, accounting, draftsman, stationary engineers, firemen, electricians, etc., and also taxes, interest on investment, depreciation of buildings, machinery, etc., varied in the different departments of one locomotive shop from 40 to 220 per cent. In comparing the cost of manufacturing material with the cost of buying similar material outside it is essential that the overhead charges for each department or material be calculated separately, as the use of an average figure will undoubtedly be misleading in many cases. If a correct charge is made for overhead, the wisdom of manufacturing material rather than buying it will in many cases be open to even more serious question.

There has been a tendency in some of the foreign countries to manufacture in the railroad shops practically all of the material used by the railroad. This has discouraged the manufacturer in the developing of his business and has stunted the growth of railway supply manufacturing concerns so that they have not been in a position, when called upon, to furnish material for export to other countries. If the railroads in this country should go to the extreme in manufacturing the materials used by them, would it not so affect the supply industries that they would not be in a position to go after and develop foreign business, thus in the end affecting the revenue of our own railroads because of the reduction in freight traffic? The freight revenue from the handling of the finished material is a comparatively small part of the total freight revenues from the raw products which must be supplied to the manufacturer.

Public opinion has been very much against the railroads and they have been harassed and hampered in every direction. The pendulum is now slowly swinging back in the other direction. One important factor in bringing this about and educating the public to a better appreciation of the railroads was the active interest which the railway supply manufacturers took in the educational campaign. Without their sympathy and good will the task would have been a far more difficult one and would have taken much longer to accomplish. From this standpoint is it not to the best interests of the railroads to continue to purchase as much of their finished supplies as possible from outside sources, thus retaining the good will and co-operation of the manufacturing interests?

Finally, and not by any means the least important factor, is that involved in the labor situation. Too much time is now required of the railroad executives in considering the handling and adjustment of labor difficulties. Why complicate this situation by going into the manufacturing business, thus increasing the number of men in the organization and multiplying in a proportion greater than the actual number of additional men required, the danger of friction and loss in the handling of labor? Is it not much better to divide this among the different manufacturers supplying railway materials and have each one handle his own special labor problems?

Doubtless there are other factors which might be considered in the effort to determine the extent to which a railway can profitably engage in the manufacture of its supplies and equipment. The foregoing are sufficiently important, however, to challenge any further tendency along these lines and should receive the most careful attention of railway officers who are considering or have gone into the manufacture of equipment and supplies to any very great extent. The wisdom of so doing would appear to be extremely questionable.

THE COMMISSION AND THE EXPRESS COMPANIES

In granting the petition of the express companies for an increase in their rates, the Interstate Commerce Comission has recognized the truth of the sentiment so well expressed by Senator Oscar W. Underwood when he said: 'The proper regulation of business requires that it must be sometimes helped and not always hindered, that we must occasionally say 'you may' and not always 'you shall not.'" Two years ago the commission prescribed a uniform schedule of rates, classifications and rules for the express companies, which went into effect on February 1, 1914. The order at that time was considered unusually drastic, but the commission indicated that in its opinion the reduction in rates would so stimulate traffic that the express companies would not suffer unduly. After a year's trial of the rates the express companies asked for a rehearing and modification of the order, showing that while the number of shipments handled had increased 1.16 per cent, their revenues from transportation after payment of the railways for handling express matter had decreased 9.21 per cent. Increased efficiency reduced the operating expenses 5.96 per cent, but the net operating revenue decreased from $1,253,438 in 1914 to a deficit of $1,132,812 in 1915, while operating income showed a deficit of $2,380,894. The commission therefore found that the present revenues are not adequate and granted the changes in rates asked by the companies, which it was estimated would afford them approximately 3.86 per cent increase in gross revenues.

It is noteworthy that no definite opposition was made by shippers. The commission says that the express companies have co-operated earnestly and fairly in an effort to make its new plan of making and publishing rates a success, and that they are entitled to reasonable relief promptly. It has thus manifested a praiseworthy disposition to remedy its own errors, and the express companies, by their attitude during the past two years, have made it easy for the commission to treat them with some consideration. After having got the public into a frame of mind where it was almost willing to see them put out of business, and with reduced rates and the new competition of the parcel post to meet, the express companies took their medicine with as good grace as possible. By exerting every effort to improve their service and to develop new sources of traffic, and by using wisely planned methods of publicity, they have not only maintained themselves in the face of the most difficult conditions, but have even attained a considerable degree of popularity.

BROOKLYN RAPID TRANSIT

The progress of the huge joint undertaking being carried on by the Brooklyn Rapid Transit and the city of New York shows clearly some of the disadvantages that may result from such a partnership. On the other hand, the company's management of its 246 miles of surface lines and 61 miles of rapid transit lines, in which, while, of course, subject to the regulation of the New York Public Service Commission, the company has a fairly free field for initiative, shows progress being made that is marked and in some aspects of national interest.

In the fiscal year ended June 30, 1915, the Brooklyn Rapid Transit earned $26,428,000, an increase of $869,000 over the previous year. This increase in revenue, however, is entirely due to the fact that the earnings from the Coney Island & Brooklyn Railroad are included for the entire fiscal year 1915 and were only included for six months in the previous fiscal year. As a matter of fact, comparing like with like and excluding from both years the Coney Island & Brooklyn, there was a decrease in 1915 as compared with 1914 due, as Colonel Williams points out in his annual report to stockholders, to the fact that a general business depression such as was experienced in 1915, with the resulting large number of men out of work in the big cities, affects street railway companies' earnings materially. An-

other reason for the decrease in passenger revenues was the increase in the issuance of transfers as the result of an order of the Public Service Commission increasing the number of transfer points from 721 to 1,008. There was an increase in the number of transfer passengers carried of 10,552,000, with a decrease in the cash passengers of 2,142,000. The financial results of the operation of the company are shown in the table at the end of these remarks.

The rate of wages on street railways is tending steadily to increase partly in line with the higher cost of living, which is most felt in the cities, and partly with the general tendency of wages in all branches of transportation to increase as the labor unions make steady progress in their constant efforts to secure shorter hours or higher wages. The street railway company, therefore, like the steam railroad, must depend on its efforts to get more and more efficient work out of each employee to offset the increased rates of wages. The Brooklyn Rapid Transit's efforts to attain this end have been specially directed toward bettering the condition of its employees and making the jobs which it has to offer more attractive, thus appealing to a higher grade of men. The Employees' Benefit Association of the Brooklyn Rapid Transit, through which the employees' welfare work is largely conducted, now has a membership of 8,000, of which 6,500 are in the operating department.

Mention has been made previously in these columns of the system of compulsory medical inspection and free medical attendance for employees excused on account of illness. This system was established on January 1, 1913, for the men in the operating department, numbering about 10,000. Steady progress has been made in reducing the amount of time lost on account of sickness, and making full allowance for the milder weather of last winter, it is estimated that the reduction in lost time attributable to this system was 8.6 per cent. in 1915. In the first year of operation of the system there was a reduction of 24 per cent. in loss of time as compared with the previous year.

Instruction is being given in first aid work, and first aid equipment cases have been installed in 68 depots, terminals and shops of the company; first aid kits have also been supplied to emergency crews and work crews.

The company has been remarkably successful in arousing an interest in its employees in its safety first campaign. This work has been organized by departments and meetings of committees and of whole departments are held at which safety problems are freely discussed by the employees. The Brooklyn Rapid Transit is also, as has been previously mentioned, conducting a campaign of education in the public schools in Brooklyn and has organized Safety Patrols among the boys and careful clubs among the girls. During the year the company distributed 234,000 safety stories among the school children.

The amount paid for injuries to passengers and damage to property in 1914 was $608,000, an increase of $64,000 over the previous year; but this increase was probably largely due to payments for accidents occurring in previous years, there being actually 1,333 fewer accidents in 1915 than in 1914.

The figures for revenue and the facts in regard to treatment of employees, etc., are, of course, in respect to the Brooklyn Rapid Transit as the operating company for the now existing surface and elevated lines of Brooklyn. The building of the New York subways and elevated extensions which is being carried on in partnership with the city of New York is in the hands of a subsidiary company—the New York Municipal Railway Corporation. The agreement between the city and the Brooklyn Rapid Transit provides for an expenditure by the city of about $100,000,000 and by the New York Municipal Railway Corporation of about $65,000,000. The new system was to have been ready for operation on January 1, 1917. Two things have occurred to very much hamper this work. On the one hand, the work which is to be done by the company all has to be approved of by the New York Public Service Commission, and every plan and form of contract is subject to the commission's scrutiny and must be approved by the commission in advance. Colonel Williams, the president, says that in some cases the commission has taken many months to consider contracts submitted to it which should have been passed on in a few days, or at the most a few weeks. This makes the extension of the company's own lines slower than it should be. The letting of contracts by the city for its share of the work has been very much delayed and contracts have been let in such a way as to promise to delay the opening of the most profitable of the new lines. The result is that the city's extension of credit which will come with the opening of the subway lines is delayed and financial hardship is also worked on the Brooklyn Rapid Transit. It is the old story of red tape and delay in municipal management, although in general the present New York City administration has a reputation for better work in this respect than most large city administrations.

The following table shows the principal figures for operation in 1915 as compared with 1914, but it must be remembered that the 1915 figures include a full year's operation of the Coney Island & Brooklyn, while the 1914 figures include only six months operation of this road:

	1915	1914
Transportation revenue	$26,096,265	$25,246,452
Miscellaneous revenue	331,421	311,797
Total operating revenue	26,427,687	25,558,250
Maint. of way and structures	2,391,815	2,021,647
Maintenance of equipment	2,401,841	2,315,990
Operation of power plant	1,553,178	1,463,284
Trainmen's wages	4,787,574	4,520,023
Other expen. of operation of cars	1,744,690	1,696,132
Total operating expenses*	14,960,381	13,994,553
Net revenue from operation	11,467,305	11,563,697
Other income	438,715	451,772
Taxes	1,700,035	1,752,880
Interest and rentals	4,693,424	4,946,884
Net available for dividends	5,512,561	5,315,705
Dividends	4,467,318	3,660,048
Surplus	1,045,243	1,655,657

*Included in this figure but not shown separately above are payments for damages, legal expenses, etc.

NEW BOOKS

Public Utilities, Their Present Value and Return; by Hammond V. Hayes, consulting engineer. 203 pages, size 6 in. by 9 in. Bound in cloth. Published by D. Van Nostrand Company, 25 Park Place, New York. Price $2.

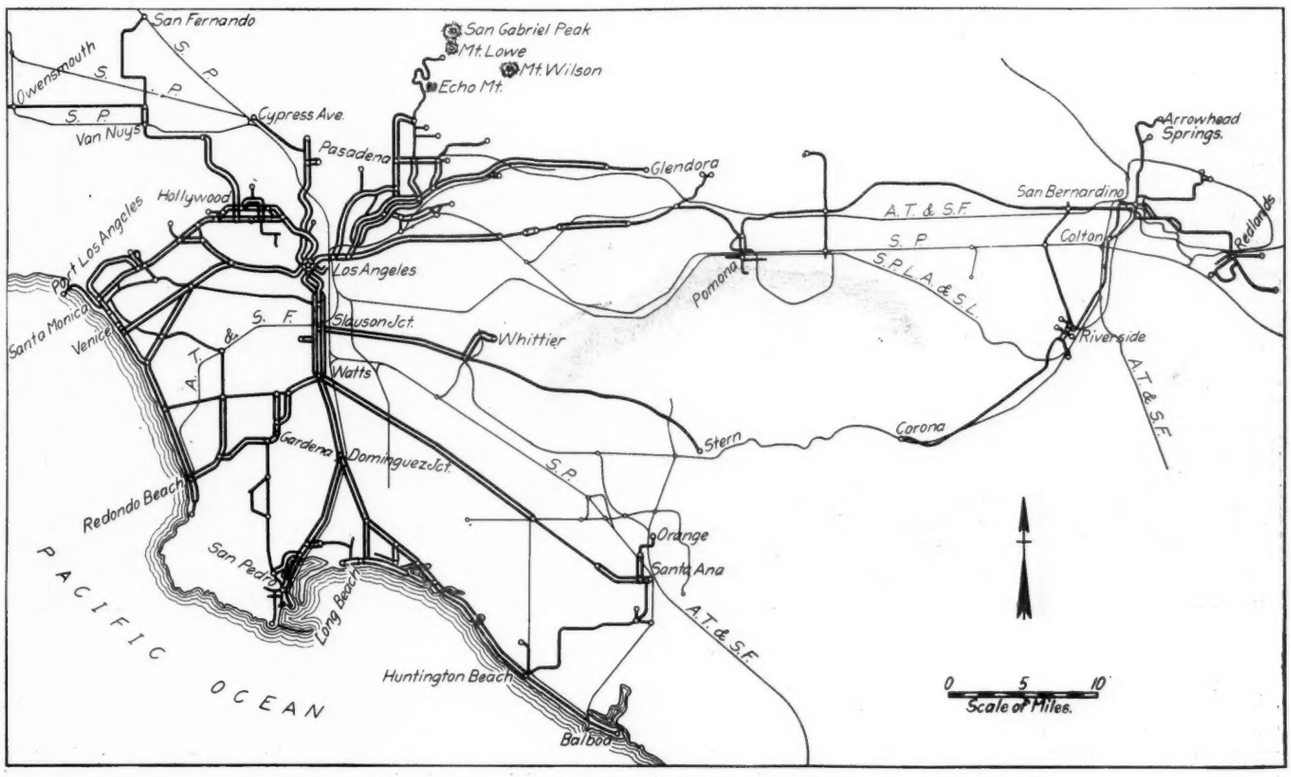
The author's first book on this subject, "Public Utilities, Their Cost New and Depreciation" (reviewed in the *Railway Age Gazette*, of February 13, 1914, page 305), was devoted largely to a consideration of the general principles underlying the ascertainment of the fair present value of a property and to the methods to be followed by engineers engaged in such work. The present book, which is a supplement to the other, deals rather with what is to be done to ascertain the fair present value after the appraisal has been made. The former book emphasized that the same valuation might not hold for purposes of sale, as for purposes of taxation, condemnation, or as a basis for reasonable rates. The present volume is confined to cases where questions of rates are involved and to public utilities subject to regulation by state or government authority. The book covers its subject under the following heads: The Present Controversy; Ascertainment of Fair Present Value; Fair Rate of Return; Replacement Cost; Actual Original Cost; Going Value, and Depreciation. The chapter on the ascertainment of fair present value is divided into discussions of the basis for fair charges for service for a new company, for a previously unregulated company, for non-competitive successful undertakings, for non-competitive unsuccessful undertakings, and there is also a division on the fair value of property of competitive undertakings. The chapter on replacement costs deals with cost of promotion, physical property and going value. In the discussion of going value it is brought out that the latter is not good will, but that it is the difference between the cost as a going concern and the capital cost, and should include such items as company organization, general expenses, legal expenses, taxes and interest during construction.

It is noted that: "Going value, consisting of costs made up as outlined in the present study, is as much a portion of the property of a company in a rate case as in a case of sale." Good will and franchise values are not to be so included.

The Operation of the Pacific Electric Railway

A Study from the Standpoint of the Steam Road Man of the Largest Interurban System in the Country

The development of electric interurban railway lines as subsidiaries of and feeders to steam roads has been most pronounced along the Pacific Coast, where both the Hill and Harriman systems have built and acquired a considerable mileage of such roads. The largest electric railway system in the country is the Pacific Electric, now controlled by the Southern Pacific, radiating from Los Angeles and giving the parent steam system an intensive development in this highly productive traffic center. Built originally for passenger traffic only, it now competes actively for freight, and, in spite of the fact that it has not actively solicited such business until with the last four or five years, its revenue from this traffic amounted to $1,203,956 for the last fiscal year and is increasing rapidly.



Map Showing the Single, Double, and Four Track Lines of the Pacific Electric System

The Pacific Electric Railway Company was originally organized in November, 1901, by H. E. Huntington and associates, to build about 1,000 miles of standard gage electric railways in Southern California, radiating from Los Angeles. Under the direction of Epes Randolph, as vice president and general manager, a comprehensive system of lines was planned into those territories capable of intensive development, and construction began at once. After building the major portion of these lines this system was consolidated on September 1, 1911, with the Los Angeles Pacific, extending from Los Angeles west to the beaches at Venice, Santa Monica and Redondo; the Los Angeles & Redondo, running from Los Angeles to Redondo Beach; the San Bernardino Valley Traction Company lines, serving San Bernardino, Redlands and Highland, and the Riverside & Arlington lines at Riverside. At the same time the interurban and the narrow gage street railway lines in Los Angeles were entirely separated. The interurban lines were reorganized and have continued under the name of the Pacific Electric Railway Company.

The further development of this system has continued steadily until today practically all of the lines laid out by Mr. Randolph have been built with the exception of a connection between the termini of the La Habra line at Stern and the Riverside line at Corona. The most recent extensions are those from Upland east to San Bernardino, a new line between San Bernardino and Riverside connecting the Riverside-San Bernardino groups of lines with the main system, and that from Harrison to Corona, in the vicinity of Riverside, both completed last year. At the present time the Pacific Electric operates 609 miles of line extending from Los Angeles west and south along the beaches from Santa Monica to Newport Beach and Balboa; southeast into the sugar beet country at Santa Ana and into the La Habra oil fields and east through the citrus country about Covina, Glendora, Pomona, San Bernardino and Riverside. Nearly 12 miles of these lines have four tracks and 286 miles double track. The system includes 1,057 miles of operated track.

THE PHYSICAL PROPERTY

Except in the cities, the lines are built entirely on private right of way, and even within the corporate limits of cities and towns the tracks are removed from the streets in many instances. Thus, at Los Angeles the private right of way extends to within seven blocks of the main passenger terminal. The standard track construction consists of 75-lb. Harriman line common standard rail on untreated red wood ties principally in gravel and

crushed rock ballast. Where not so ballasted, the sand or dirt roadway is oiled heavily at regular intervals to compact it. This is especially necessary on those lines along the beaches where the sand drifts badly at times during the long dry season.

Because of the frequent stopping and the heavy braking of trains, and the use of multiple tracks in one direction only, the track creeps badly, having been observed to move as much as 36 ft. on one long trestle in six months.' This requires the liberal use of rail anchors, especially on the tracks approaching heavy traffic stations where the pull is greatest. Manganese track construction is used almost exclusively for special work. This road has been a pioneer in the use of solid manganese and employs it almost exclusively for frog and switch work on the lines with heavy traffic. On the other lines built up manganese frogs and switches are installed.

Double tracks are built 15 ft. 6 in. between centers. On the four-track lines, the distance between the centers of the outside tracks is 13 ft. 6 in. The stations vary in size and design from the nine-story general office and passenger terminal building at Los Angeles to the frame or concrete passenger shelters at outlying passenger stops. Regular agents are maintained at

The Station at Monrovia, Cal.

all stations of sufficient traffic to justify their employment, including some 40 points, who devote their entire time to the company's business. At most of these places standard stations are provided, equipped with ticket offices, parcel, freight and express rooms, waiting rooms, etc. No general design has been adopted, as in many cases it is desired to harmonize the construction of the station with that of the surrounding buildings in the communities, many of which are suburban towns.

While the road formerly generated its power at its own steam plants, the development of hydro-electric and other power by large power companies has made it more economical to purchase it from these large producers, and the company's steam plants are held in reserve. Power is delivered at convenient specified points on the railway company's lines at 15,000 volts and transmitted at this potential to the various substations, of which there are now 52, the power wires being carried over the greater portion of the system on the railway company's pole lines. These substations are spaced from 6 to 12 miles apart on busy lines and from 10 to 12 miles apart on those of lighter traffic. The equipment installed in the different substations varies with the traffic demands and also with the age of the substation.

The rapid development of the traffic on this system has made it exceedingly difficult to provide sufficient power at all times. To handle peak loads or to allow a substation to be taken out of service for repairs, four portable substations have been built. These are constructed on 50-ton steel flat cars, and are housed in and feed directly from the high tension power lines above mentioned. Each of these portable substations is equipped with a transformer and a 600-kw. motor-generator set. This equipment is of special value in handling heavy traffic such as the sugar beet rush in the fall, as it can be set out on any siding and cut in on the power line directly wherever the energy may be the most needed.

Power is delivered to the motor equipment by means of simple feed and trolley wires on all lines. For single and double tracks the construction is the same, as it has been assumed that any stretch of single track will eventually be double tracked. The trolley wire is supported on single poles with pipe arms on most of the single and double track sections and span pole construction on four track lines and on most curves, side tracks, station and yard tracks, etc. Catenary construction has been adopted on the lines built recently, with a view to gradually changing over to this form of overhead construction over the entire system. The extension from Upland to San Bernardino is operated at 1200 volts d.c. and the line from Upland into Los Angeles is being changed over to this from 600 volts. All other lines are now operating at 600 volts, but it has been the intention to go to 1,200 volts as fast as the overhead construction is changed to the catenary type.

At the end of this year nearly all crossings with steam roads will be completely protected with all-electric interlocking plants, and within another year all other crossings and junction points will be similarly protected. Twelve interlocking plants are now in service, three others are under construction and five more are provided for. Those built recently are all-electric with track circuit approach locking. One of the most modern is that completed at Watts, 18 miles south of Los Angeles, where three busy double track lines converge into one four-track trunk line. This plant now has 76 working and 12 spare levers and is said to control more functions than any other plant west of the Rocky Mountains. Over 1,000 scheduled trains pass over it daily, requiring over 6,000 lever movements. During two hours in the morning and the same period in the evening a train passes over the crossing every 0.85 minute.

Automatic signals are being installed gradually on the busiest lines. Last year three-position light signals were installed on 9½ miles of the Venice Short Line and also on four miles of the Pasadena Short Line. The Venice line was signaled for 1 minute headway at a speedway of 30 miles per hour. Two miles of the Pasadena line was signaled for 45 seconds headway at 20 miles per hour, and two miles for 1 minute headway at 30 miles per hour. To give an idea of the density of the traffic, over 15,000

passengers are carried daily between Los Angeles and Pasadena alone. Between Los Angeles and Long Beach three-car trains are run in each direction at intervals of 20 minutes daily from 8:00 a. m. to 8:00 p. m., with double service on Sundays and holidays. This line also furnishes similar service to San Pedro, traveling over the same rails as far south as Dominguez Junction, in addition to freight traffic, the most of the freight traffic, however, being handled over all lines at night.

The company operates 675 passenger cars, all of which are provided with motors. It also operates 18 express cars which can be operated singly and which have power sufficient to haul as many as five to eight loaded freight cars. The company also operates sufficient freight equipment for its own traffic, although it requires foreign lines to provide equipment for through shipments from points on its lines to the more distant points on the steam roads. It operates 55 electric locomotives in freight service exclusively, 10 of which are in switching and the remainder in road service. These locomotives are operated in two shifts as the business demands, giving practically 24 hours' continuous operation. The newer locomotives weigh 62 tons and are provided with four 250-h.p. motors. They have a tractive effort of 21,000 lb. at 17.6 miles per hour and a maximum tractive effort of 30,000 lb. The freight equipment is fully up to steam road standards. Recent purchases include 90

A Four-Track Line Dividing into the Double-Track Lines at Watts

box cars with steel underframes, 225 steel flat cars and 250 steel dump and gondola cars, all of 100,000 lb. capacity.

New general shops have been planned to be built at Torrance, midway between Los Angeles and San Pedro, to replace older shops in Los Angeles. The company now builds none of its equipment but does all its own repair work, employing about 800 men for this purpose.

TRAFFIC

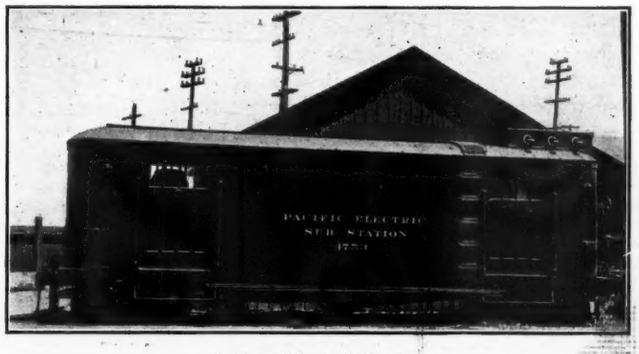
The revenues of the Pacific Electric for the fiscal year ending June 30, 1914, were $9,467,483.15, divided as follows:

Passenger revenue	$7,366,661.40
Baggage revenue	1,277.16
Hire of chartered cars	45,691.80
U. S. mail revenue	18,038.96
Express revenue	144,655.70
Milk revenue	34,503.99
Freight revenue	1,203,956.31
Switching revenue	30,753.04
Miscellaneous transportation revenue	173,600.26
Total transportation revenue	9,019,138.62
Revenue other than transportation	448,344.53
Total	$9,467,483.15

Approximately one-half the passenger revenue is commuter traffic and the remainder is largely local, although through tickets are sold to all points from the more important agency stations. Wells, Fargo & Company and the Postal Telegraph Company operate over the entire system. United States mail is also carried on a number of the trains, mostly in closed pouches, although railway postal cars are operated over several of the lines.

An interesting situation has recently arisen with reference to passenger traffic. The state and the various counties in Southern California have spent large sums of money during the past few years in the construction and improvement of the public roads. This has greatly stimulated automobile traffic and has resulted in the appearance of large numbers of "jitney" busses competing for passengers and express business not only in Los Angeles and the immediate suburbs but to points as far distant as Venice. While it is difficult to see how this can prove profitable and therefore exist permanently, it is cutting into the passenger revenue of the Pacific Electric seriously at this time and is an exceedingly difficult competition to meet, as it is largely unregulated.

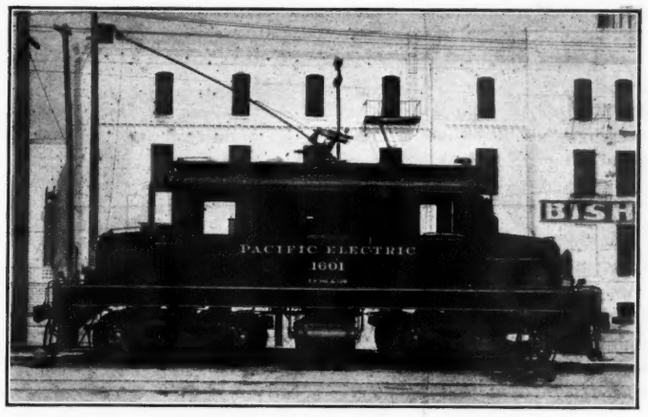
Over 3,200 scheduled passenger trains are operated daily in



A Portable Sub-Station

addition to 62 way freights and 84 express trains. This excludes heavy drag freight trains which are not regularly scheduled but are run as the traffic demands. Over 185,000 passengers are carried daily.

It is the freight traffic in which the steam railway man is most interested. As stated above, these lines were designed and built originally for passenger traffic alone with no thought of developing a freight business. With the building up of new communities removed from other railway facilities, there soon arose a demand for the transportation of building and other materials. This condition combined with the acquiring of these lines by the Southern Pacific has resulted in special attention

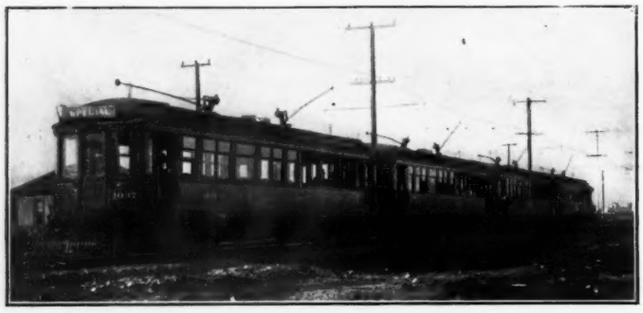


One of the Newer Locomotives

being given to the solicitation of freight traffic within the past four or five years. The greatest stimulus was given to this business on December 1, 1913, when the Pacific Electric secured joint rates with the Southern Pacific and the San Pedro, Los Angeles & Salt Lake on citrus fruits, followed by similar rates on other commodities on January 1, 1914. This road also participates now with the Santa Fe in joint rates from certain points on the Pacific Electric lines to Arizona and California points on the Santa Fe. As a result, the Pacific Electric is now enabled

to solicit through as well as local business on an equality with the steam roads, which was essential to it if it was to compete successfully for the transportation of citrus fruits, sugar and similar products, practically all of which go to the East.

About 200,000 tons of freight is handled monthly, of which about 80 per cent. is local traffic, the remainder being delivered



A Regular Passenger Train

to and received from the steam lines at Los Angeles and other connecting points. This traffic is growing rapidly, having doubled within the past four years and is increasing even more rapidly now that the road is permitted to solicit traffic for and from points beyond its own lines. The rapid building up of communities along these lines is also adding to the traffic. As for instance, Torrance, an industrial town, less than three years old, is now giving the road over 100 cars of revenue business monthly. The ability of an electric line to furnish frequent and rapid freight and passenger service results in such communities developing faster and the land being given over to more intensive cultivation than would be the case if they were on steam road lines only, with but one or two trains daily.

The car load business consists principally of oil, rock, sand and gravel, vegetables, citrus fruits, nuts, lumber, grain and hay. The largest individual source of traffic is oil from the La Habra fields which goes to Los Angeles for distribution. Two or three solid oil trains are operated daily, the total shipments for the last fiscal year amounting to 449,565 tons or 10,440 cars. Over 11,000 cars of rock, sand and gravel were hauled last year for building and highway construction.

The next largest source of traffic is vegetables, consisting principally of sugar beets, which furnished 4,224 cars. Large quantities of sugar beets are raised in the vicinity of Santa Ana. About 500,000 tons are produced annually in the area tributary to the line between Santa Ana and Huntington Beach, 9 miles long, and three large sugar factories are located on this line. Over 3,000 cars of lumber and 1,000 cars of citrus fruit were also handled during the past year and it is estimated that about 3,000 cars will be handled during the present year. This latter business especially is increasing rapidly, resulting from the through billing arrangement and also from the extension to San Bernardino, passing through the well-developed citrus area.

Another important source of freight traffic on the Pacific Electric is the l. c. l. merchandise business. About 25 per cent of the freight handled consists of this traffic. About 45 cars are loaded daily at the Los Angeles station alone. Two l. c. l. freight trains are run over each line daily. All such freight received during the forenoon is delivered at the various stations over the system the afternoon of the same day. All freight received up to 5:30 p.m. is loaded during the early evening and taken out during the night. At the largest stations for which full cars are loaded, this freight is ready for delivery at 7:00 o'clock the following morning. At the smaller stations, where no regular agents are employed, and where freight left on the platforms during the night is liable to loss by theft or from the weather, it is delivered during the forenoon on the return trip. Additional service is given perishable products for the ocean resorts received up to the middle of the afternoon, for which deliveries are made the same evening.

As a result of the through rating, the tonnage turned over to connecting lines at Los Angeles has increased from 10,000 tons monthly one year ago to as much as 20,000 tons at the present time. An average of about 25 carloads are turned over to the Southern Pacific alone each day. Over 800 cars of citrus fruits were delivered to the Southern Pacific at Los Angeles for movement East during the winter of 1914 and 116 to the San Pedro, Los Angeles & Salt Lake. During the past winter this interchange traffic of citrus fruits increased to about 1,600 carloads.

A Drag Freight Train

OPERATION OF THE PROPERTY.

For operating purposes the Pacific Electric is divided into four divisions. The Northern division includes the lines from Los Angeles to Pasadena, San Gabriel, Glendale, Glendora, Pomona and Upland with 156 miles of main line. In addition to handling a very heavy passenger business, this division also secures considerable fruit traffic from the Glendora and Upland lines. The Western division includes the lines to the beaches

as far south as Redondo Beach and to Van Nuys, Owensmouth and San Fernando in the San Fernando Valley. It handles a very heavy passenger traffic with only local freight and comprises 142 miles of main line. The Southern division is the largest, with 209 miles of main lines, including those to San Pedro, Huntington Beach, Santa Ana and La Habra. While the first two lines handle a heavy passenger traffic, this is primarily a freight division on which originate the oil, sugar beets, various other vegetables, and a considerable fruit traffic. The Eastern division with 102 miles of main line, comprises the lines in the vicinity of San Bernardino, Redlands, Riverside and Corona, connecting with the Northern division at Upland. Previous to the completion of the connection between Upland and San Bernardino last July, this division handled local traffic only. It is now succeeding in developing a considerable fruit and other freight traffic as well.

The operating organization is similar to that existing on steam roads. The general manager is in charge of all departments, with a general superintendent in charge of transportation matters. Each division is in charge of a superintendent, with one or more assistant superintendents; the division organization being based more on the number of employes and the density of traffic than on the number of track miles. The maintenance and operating, engineering, mechanical and electrical departments are each in charge of an executive engineering officer reporting direct to the general manager.

The standard code of the American Railway Association is used in operation, modified where necessary for electric operation. All despatching is done by telephone. The despatchers give their orders direct to the conductors, who copy them on standard train order forms, giving copies to the motormen. At all outlying points where there are no station buildings, telephone booths are provided under lock and key, cutting in directly onto the despatcher's wire.

In addition to the passenger and l. c. l. freight trains referred to above, regular milk trains are operated daily with a minimum of 2 cars each. In addition, several points ship milk in car load quantities. These milk and l. c. l. trains are regularly scheduled.

All drag freight trains are run extra and are ordered as the traffic warrants. These trains are run almost entirely during the night to avoid interference with the passenger trains and to secure a more economical power factor. One interesting problem in their operation has been the difficulty in preventing the crews from overloading the locomotives. With steam operation the only effect of this is to stall the train, but an electric locomotive is subjected to severe damage when overloaded.

About 6,000 men are employed in all departments of the Pacific Electric, of which about 1,600 are in passenger train service and 150 in freight and switching service. All the men employed are non-union. While numerous attempts have been made to organize the employes in various departments, the attempts have always been unsuccessful. Train service employes are paid on a graduated scale increasing annually for 5 years. They work on a 10-hour per day average basis, 7 days per week. To train men for this service a school is maintained at Los Angeles, during attendance at which the students and new men are paid $0.25 per hour for actual time put in and are guaranteed a minimum of $45 a month.

RAILWAY DEVELOPMENTS IN BULGARIA.—A British consular report says that at the end of 1912 there were 1,388 miles of railway completed to Bulgaria, the number of passengers conveyed being 3,342,000. The weight of the merchandise transported annually averages 2,000,000 tons. The construction of the following lines may be taken in hand during the present year: Radomir-Dupnitza-Gorna-Jumaia, with extension down the Struma valley to the Greek frontier, Plevna-Lovetch, Dupnitza-Bobov-Dol, and Gabrovo-Sevlievo. Work is progressing on the survey and preparation of the Mikhailovo-Haskovo-Porto Lagos line.

TRAIN ACCIDENTS IN JUNE[1]

The following is a list of the most notable train accidents that occurred on railways of the United States in the month of June, 1915:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd
†24.	Western Md.	Thurmont	bc	P. & P.	6	6
27.	Chicago, R. I. & P.	Platte River.	bc	F. & F.	3	5
29.	Mobile & Ohio.	Lawley.	bc	P. & F.	1	9

Derailments.

Date.	Road.	Place.	Cause of Derailment.	Kind of Train.	Kil'd.	Inj'd
3.	Chicago & Alton.	Minier.	Exc. speed.	P.	0	22
5.	Chi., St. Paul, M. & O.	Northline.	Landslide.	P.	1	2
5.	Chi., Mil. & St. P.	Lake City.	Washout.	P.	3	10
6.	Mo., Kan. & Tex.	Dallas.	d. track.	F.	0	3
8.	St. Louis & S. F.	Carrier, Okla.	Exc. speed.	P.	0	52
†9.	Seaboard A. L.	Birmingham.	Malice.	P.	3	15
29.	Erie.	Mahoning.	Acc. obst.	F.	2	0

The trains in collision near Thurmont, Md., on the night of the 24th were westbound passenger No. 11, and eastbound passenger No. 10. The collison occurred on a high bridge and the baggage car of the westbound train fell to the ravine below. The engines were badly damaged, but remained on the bridge, as did all of the rest of both trains. In the baggage car which fell were two passengers, both of whom were killed; and the baggageman, one engineman, one fireman, and a traveling fireman were also killed. Several passengers were injured. The collision was due to a mistake of the train despatcher, who sent conflicting orders.

The trains in collision near Platte River, Mo., on the 27th, were both fast freight trains, and at the time of meeting were running about fifteen to eighteen miles an hour. Both engines and five cars were demolished. One engineman, one fireman and one brakeman were killed, and two other trainmen were injured. The westbound train, several hours late, and inferior to the eastbound, encroached on the other train's time without orders.

The trains in collision near Lawley, Ala., on the 29th, were southbound passenger No. 107 and a northbound locomotive running without cars. Both engines were badly wrecked and were overturned. One fireman was killed and both enginemen and seven passengers were injured. The empty engine was running on the time of the superior southbound train, without orders, the engineman having overlooked the schedule of No. 107.

The train derailed near Minier, Ill., on the third of June was eastbound passenger No. 70, and the tender, two baggage cars and one passenger car were overturned. Twenty passengers and two trainmen were slightly injured. The train was running at about 40 miles an hour, and the tender was the first vehicle to leave the rails, too high speed on soft track being apparently the cause.

The train derailed near Northline, Wis., on the 5th was a westbound passenger. The engine and three cars went off the track and the engine was overturned. The engineman was killed and two other employees were injured. The derailment was due to a landslide, caused by a cloudburst.

The train derailed near Lake City, Minn., on the night of the 5th, was a westbound passenger, and the engine and first two cars fell into the Mississippi River. No passengers were killed. Two trainmen and one other person were killed and eight passengers and two other persons were injured. The cause of the derailment was the weakening of a bridge abutment by a cloudburst.

The train derailed on the 6th, about 7 a. m., near Dallas, Tex., was a southbound freight and the engine and two cars were overturned. The engineman, fireman and one brakeman were injured. The cause of the derailment was soft roadbed.

The train derailed near Carrier, Okla., on the night of the 8th was a westbound passenger, running about 35 miles an hour. Two cars were overturned and 52 passengers were injured. The

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction—unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

derailment is believed to have been due to excessive speed. The tender was the first vehicle to leave the rails.

The train derailed near Birmingham, Ala., on the night of the 9th, was westbound passenger No. 5, and the engine and four cars were ditched. The engineman, fireman and road foreman of engines were killed and nine passengers were slightly injured. The cause of the derailment was the malicious removal of a rail, one rail having been unbolted and taken up and laid across the track.

The train derailed on the 29th, at Mahoning, Ohio, was a southbound milk train, and five cars were ditched. The engineman and fireman were killed. The derailment was caused by a piece of machinery, which was lying on the track, having just fallen from a train passing on the adjacent track.

THE ALASKAN GOVERNMENT RAILROAD

Plans have been outlined for the first season of actual construction on the United States Government Railroad in Alaska. As announced in the *Railway Age Gazette* of April 23, 1915, the route adopted extends from Seward on Resurrection bay across Kenai peninsula and the head of Cook inlet, ascending the valley of the Susitna river, crossing the Alaska mountains through Broad pass and then descending the Tanana river to Fairbanks, a total distance from Seward of 471 miles. From Seward to the head of the Turnagain Arm of Cook inlet the road follows the line of the Alaska Northern, which the Government purchased

Location of the Proposed Government Railroad

for $1,150,000. It was originally intended by the projectors of this road to follow substantially the same course which the Government has now adopted, but the line ran into financial difficulties very early in its career, and only 71 miles of the line were built. A sale was finally made to the bond holders, who ordered construction work stopped, and rather than pay the $100 a mile tax, discontinued the operation of trains. During the past four years the road has been operated by a "citizens' committee," using gasoline cars, during the summer only.

The Government intends to use the Alaska Northern this year as far as mile 34. Owing to the poor physical condition of the road it will be necessary to make very extensive renewals and repairs before it will be in shape to use.

From the head of Turnagain Arm the line will be entirely on a new location, turning to the west along the north shore of the Arm to Ship creek, at the mouth of Knik Arm, then in a generally northerly direction along Knik Arm to the old town of Knik, at the mouth of the Matanuska river, 77 miles from Kern creek at the head of Turnagain Arm. At Knik the line turns northwest across the valley of the Susitna river. The most difficult part of the work on this end of the line will be the rock cuts and tunnels along the north side of Turnagain Arm between Kern creek and Bird creek. Work may be started later in the season from the Kern creek end and will continue in the tunnels through the winter months.

The first portion of the new line to be built will be from Anchorage, known also as Ship creek, to the Matanuska coal fields; 34 miles of this is main line, while 38 miles will be on the Matanuska coal branch, leaving the main line at Matanuska Junction near Knik. Anchorage is located on navigable water at the mouth of Knik Arm, so that by building this line first, immediate access will be had to the rich coal fields of the Matanuska without waiting for the completion of the line to Seward. The sea connection at Anchorage will also save 117 miles of train haul from Anchorage to Seward. In some seasons ice forms in considerable quantities in the upper end of Cooks Inlet, making navigation rather difficult for three or four months. This detracts somewhat from the advantages of Anchorage as a harbor. The tidal range is from 35 to 40 ft. There is plenty of good available land in the vicinity of Anchorage for terminals.

The town of Knik, located at the head of Knik Arm, is the center of a considerable mining region, which gives promise of a great future. It cannot be used as a sea terminal, because the upper end of Knik Arm is not navigable at low tide. There is considerable good agricultural land in the vicinity of Knik. Seward, the south end of the Government line, will be the winter terminal for the entire line, and will serve the Kenai peninsula the year round. It is located on deep water, on Resurrection bay, and has long been an important port on the Alaskan peninsula. The old dock of the Alaska Northern will have to be largely rebuilt before it will be of service.

It is expected that parties put in the field this year will complete the final location for the entire line between Seward and Fairbanks. The information collected on the preliminary lines run last year is so complete that the work outlined for this season should be completed without difficulty.

The appropriation for carrying on the work this year is $2,000,000. Because of climatic conditions and the difficulty of getting equipment in to the line, most of the work will be done by station men on small contracts. The experience gained by this method this year will aid in determining the method to be followed in building the remainder of the road later.

Construction work at Anchorage commenced in May, and is now progressing quite rapidly over a distance of twenty miles. So far the material encountered is mostly gravel which is quite easily worked. There are many excellent station men on the ground, anxious for the work at reasonable prices. Considerable clearing has to be done all along the line, as the country is covered with a growth of small birch and spruce. Rails are now being contracted for, and it is expected that about thirty miles of track will be laid before winter. During the winter some rock work can be carried on, but earth work cannot be done to advantage. During next season it is expected that the work will be pushed more vigorously.

The entire project is under the direction of the Alaskan Engineering Commission, of which W. C. Edes is chairman, and to whom we are indebted for the information given above.

DANISH STATE RAILWAYS.—The earnings of the State Railways in Denmark during the financial year 1914-15 represent a record figure, amounting to about $3,105,000. Owing to the extraordinary conditions prevailing, ample sums have been written off and added to the different funds, the net profits thereby being fixed at $2,295,000, the same amount as the previous year. Last year differed considerably from ordinary years, inasmuch as the war at the outset reduced the income to an unprecedented minimum, but later the traffic grew to such an extent as has never been witnessed before.

How Do You Select and Promote Your Men*

Simple and Practical Suggestions Looking Toward the Solution of a Most Difficult and Troublesome Problem

By Roy V. Wright

Possibly no one problem is of greater importance to the railway executive or industrial manager than that of knowing how best to select men either to enter the organization at the bottom or for promotion to more important positions. We can analyze the properties of materials and predict their performance under given conditions with more or less accuracy. The human element, however, which controls the use of these materials and is by far the most important factor in determining the efficiency of operation of a manufacturing plant or a railway property is far more difficult to analyze and direct with a view to securing maximum efficiency. The necessity of giving greater attention to this element has become more and more evident in the intensive dvelopment toward greater efficiency which has been so marked during recent years. The selection of men is such a complicated problem, however, that many executives have gone on as best they could, feeling that science could contribute little toward its practical solution.

Vital as is this problem to a manufacturer or industrial plant, it is far more important to the railway with its forces scattered widely and with the higher executive officers, and many even of the minor ones, unable to keep in close or intimate touch with their subordinates.

In attempting to solve the problem of the selection of men some have looked to experimental psychology, such as is exemplified in Professor Hugo Munsterberg's work and particularly as outlined in his book on "Psychology and Industrial Efficiency." Others have looked into the theory of phrenology, feeling that possibly it might be used to determine the characteristics of different individuals with a view to seeing whether they were fit for promotion or whether by this means men could be selected with any degree of success for performing certain specific classes of work. Then we have had the theories of Dr. Katherine M. H. Blackford, which take into consideration certain physical characteristics, including color (blond or brunette), shape and profile of head, size, structure, texture (fineness or coarseness of fibre or grain as seen in the hair, skin, nails, features, hands, feet and general body build); consistency (hardness, softness or elasticity of bodily tissues), proportion, expression and condition of body, clothing, etc. Dr. Blackford it was who placed special emphasis on keeping three things in mind in selecting a man for a job: First, the type of job; second, the characteristics of the man himself, and third, and possibly equally important, the characteristics of his boss. Some of the claims which are made for this science of character analysis are defined in an advertisement in one of the recent numbers of a popular magazine in the following words:

> In this course you learn to judge others quickly and accurately. You learn to know what a man's appearance means—his face, his head, his hands, his eyes, his expression, his walk, his handwriting—everything about him. You do not measure his head or ask him questions or let him know in any way what you are doing. There are no repetitions, no theories, but a clean-cut presentation of the principles underlying human character—with so many photographs, diagrams and charts that you can learn and apply the principles rapidly and easily, etc., etc.

Of how much value are all of these things? How much reliance may be placed upon them? If they are not satisfactory or reliable, is there any practical way of selecting a man for a job or for promotion with a fair degree of certainty as to his fitness for the position? The remainder of this brief talk will be devoted to answering these questions.

Most of you have undoubtedly heard of Dean Hermann Schneider, of the University of Cincinnati, and possibly some of you are fortunate enough to have had the pleasure of meeting and becoming acquainted with him. He it was who first put into effect in a big way the idea of having practical and theoretical training go hand in hand in engineering education, by securing the co-operation of the machine tool builders and manufacturers of Cincinnati with the university, and in establishing the co-operative engineering courses. The wonderful results which followed this experiment make a long story and doubtless are familiar to many of you. Suffice to say here that the results were so eminently practical and so striking that in one form or another the methods are rapidly being extended far and wide, both in connection with engineering courses, in colleges and universities which are so located as to be able to secure the co-operation of industries, and also in many lines of industrial and vocational training throughout the country.

As a concrete example, let us consider what happened in one large department store. Those in charge felt that the sales force was not doing its best work because the employees were not properly trained, either in general education or as to their knowledge of the merits of the products which they sold, to deal to the best advantage with the leading people of the city who did their shopping in the store. Manifestly there are certain times during the day when it is not necessary to have all of the sales force on duty. Arrangements were made with the city school system to provide instruction during these periods, to those who could be spared, in English, civics and other studies which would develop the employees into bigger and broader men and women and make better citizens of them. Then, too, the employer, who provided and fitted up the schoolroom, saw to it that expert instruction was given in the methods of manufacture and as to the merits of the different products which were sold.

The latest development along this line is the general vocational training movement which is spreading throughout the country. New York City, for instance, has gone into the matter on a large scale and has retained Dean Schneider as one of its chief advisers. In the Woolworth Building, where our offices are located, the representatives of the city school system have made a canvass to find whether a sufficient number of employees can be spared at different times during the day to warrant the fitting up of a schoolroom and the providing of instruction in the building. At the shops of the Baltimore & Ohio on Staten Island, the city is co-operating by providing instruction to the apprentices, the railroad furnishing the schoolroom—an old passenger car—and the Board of Education of the City of New York paying the salary of the teachers, who in this particular case are employees of the railroad, and also for the material used.

I have outlined this development thus fully, not because it has any special bearing on the subject under discussion, but because I want you to have some idea of what Dean Schneider has done and of that for which he stands. He is a man with a hobby, but he is big enough to see over and around it. He has a keen and analytic mind and is capable of sizing a problem up from a broad and liberal viewpoint. He has a splendid supply of patience and is absolutely unselfish in his efforts to help others.

In connection with the work of the co-operative engineering courses at Cincinnati, which have been carried on for a number of years, Dean Schneider and his associates have come in contact with hundreds of young men whom they have had an opportunity of studying critically and whose progress along both practical and theoretical lines they have been able to observe and follow closely. Because of the nature of the work, the students spending alternate weeks in the manufacturing shop and in the

*An address given at a luncheon of railway officers at the Auditorium Hotel, Chicago, Tuesday, June 29, under the direction of the General Railroad Committee of the Chicago Y. M. C. A.

classrooms at the university, the instructors and shop co-ordinators can get closer to the students and know them more intimately than under the usual conditions. Moreover, they have been able to follow many of these men after they left the institution and to observe their progress.

As stated by Dean Schneider in a paper entitled "The Problem of Selecting the Right Job," which was recently presented before the third annual convention of the National Association of Corporation Schools, "one leg of the tripod upon which the co-operative system of education rests is the selection of men for the work for which they are to be trained." The university authorities, on the basis of their study and observation of the individual students, now guarantee to Cincinnati manufacturers for certain jobs men who have finished three years in the co-operative course.

In the effiort to determine whether phrenology, physical characteristics or applied experimental psychology had any merit in such selection, a great number of experiments were made on mature students whose characteristics and qualities were well known, but not by those actually conducting the tests. The tests demonstrated conclusively that these systems were not at all reliable and that the only practical and successful way of selecting men is by testing them out on the actual job.

Concerning the tests as to physical characteristics Dean Schneider stated: "This seems to be a development of the old idea of phrenology. It is claimed in this system that physical characteristics indicate certain abilities. For example, a directive money-making executive will have a certain shaped head and hand. A number of money-making executives were picked at random and their physical characteristics charted. We do not find that they conform at all to any law. Also we found men who had the physical characteristics that ought to make them executives, but they were anything but executives. A number of tests of this kind gave negative results. We were forced to the conclusion that this system was not reliable."

As to applied experimental psychology the Dean had this to say: "The science of applied psychology seems to be at the point where chemistry was when it was alchemy; we may hope, however, that Illusion is the First Appearance of Truth."

It is not my intention, and I very much doubt if it was Dean Schneider's intention, to unqualifiedly and wholly condemn these things. It is quite possible that they may contain certain elements of truth. The trouble is that they are being carried to a ridiculous extreme. If on the other hand they are instrumental to some degree in awakening executives to the importance of the problem, they will have served a useful purpose.

Dean Schneider finally concludes, on the basis of the study and testing of about 1,000 mature students, both in theoretical and practical work, that: (1) A worker's failure is as significant as his success and should be analyzed to indicate a new and fitting job; (2) the characteristics developed by analysis of many successes and failures furnish a basis for placement which works better than any plan we know; (3) the method is crude and unscientific; it requires a period of time much greater than other methods proposed, but it insured a reliable verdict.

Knowing of the man and his work as we do, we are pretty safe in accepting his conclusions. Doubtless they agree fairly closely with those of many in the audience who, however, have not been in a position to prove their correctness, not having had the exceptional opportunities for observation possessed by Dean Schneider.

On these conclusions as a basis, how can we go ahead logically to induce the supervising officers to study more critically the characteristics and work of the men who enter the service, with a view to determining whether they are properly fitted for the tasks to which they are assigned? It would seem that in hiring men the initial selection should be made by members of the organization who have some special ability in sizing men up; then if they are closely watched and given a thorough trial on actual work, it should be possible to determine within a reasonable time whether they are the sort of men that will prove satisfactory and along what lines it will be best to develop and train them.

The trouble under present methods is that a new man taken into the organization is in most cases not given any systematic attention. If he is very bad he is fired. If he is passably good he is allowed to remain, but no one knows with any degree of certainty whether he is the best man for the job, or whether he is capable of doing better work or not.

A simple method of checking the personality and performance of these new recruits will be described. It was not developed and used especially for that purpose, but is admirably adapted to it, as well as for checking men already in the service with a view to determine whether they are properly placed, along what lines they can best be developed and just which ones are best suited for promotion to more important positions. It has been tried out on a large scale with splendid results and is inexpensive to install and maintain. It cannot be successfully inaugurated or followed up, however, unless it has the enthusiastic backing and support of the higher executive officers.

Briefly, the scheme is as follows: Each foreman or supervising officer is provided with a sufficient number of special report cards to cover each one of his immediate subordinates, which he is required to fill in and return to his superior officer. He is not expected to keep any copy of these reports and is called upon at periods, of say six months, to make similar reports on each man. The comparison of the reports for any individual will show whether he has made progress in improving his weak points. If he has not, or has apparently fallen behind, his superior is asked for an explanation and is held responsible either for failure to properly train and develop the man or for lack of accuracy in sizing him up in making his reports.

In this way the foreman or officer is automatically compelled to study his men more closely, and the effect in improving and developing the executive ability of such officers is a most noteworthy feature.

The characteristics upon which a report is made are such as to indicate a man's fitness for holding a position in the organization and as to whether he is worthy of promotion. The items on a report card,* which was used by LeGrand Parish, with standard and concise definitions, are as follows:

EDUCATION: Mental and moral training.
SPECIAL KNOWLEDGE:
EXPERIENCE: Knowledge acquired by actual trial and observation.
HONESTY: Upright disposition or conduct.
MORALITY: Accord with the rules of right conduct.
TEMPERANCE: Moderation.
TACT: Ability to do or say what is best for the intended effect.
RESOURCE: Good at devising expedients.
RELIANCE: Sure dependence.
FORESIGHT: The act or power of foreseeing.
APPEARANCE: Outward look or aspect.
MEMORY: Mental hold on the past.
ENERGY: Active, effective.
INITIATIVE: The ability or disposition to take the lead.
PERSISTENCE: Steady or firm adherence to or continuance in a stated course of action or pursuit that has been entered upon.
ASSERTIVENESS: Affirming confidently, positive.
DISCIPLINE: To teach rules and practice and accustom to order and subordination.
PROMPTNESS: Quickness of decision or action.
ACCURACY: Correctness.
SYSTEM: Regular method or order.
ORGANIZATION: A systematic and regulated whole.
EXECUTIVE ABILITY: Ability to carry into effect in a practical manner.

A man is graded, as very good, good, medium or poor in each of these characteristics.

This scheme eliminates the "hit and miss" method of selecting men for promotion and was instrumental in locating suitable men with considerable accuracy. Too often when it comes to promoting men a decision is based on the man's recent performance, when he may have done some spectacular piece of work which placed him in the limelight, but which may not give any indication of his fitness for holding an executive position. The men throughout the organization, understanding that these records were being kept, were encouraged to improve and better themselves. Men who were unsuited for the work to which they were assigned were discovered and transferred to tasks for which

*For more complete description of this card see *American Engineer and Railroad Journal*, December, 1908, and *Railway Age Gazette*, July 23, 1915, page 151.

they were better fitted, or if they were found hopeless, were eliminated from the organization.

These report cards were developed ten years or more ago and remained in use several years until Mr. Parish left railway service—long enough to demonstrate their value beyond question. In the light of experience it was Mr. Parish's idea to revise the characteristics, including some which are not shown in the list quoted and eliminating or changing others.

It so happens that Dean Schneider, in making his observations, employed record cards of a somewhat similar nature, but possibly of a broader scope and more closely approximating the ideal toward which Mr. Parish was working. The characteristics noted on Dean Schneider's records were as follows:

Physical strength, or physical weakness. In some occupations physical strength is essential; in others it is not.

Mental, or manual. This may be stated in another way and in rough terms as "head efficiency" as compared with "hand efficiency."

Settled, or roving. Some men work best under a steady routine; others like to move about and see or do new things.

Indoor, or outdoor. Some men thrive best under outdoor work; others prefer indoor work.

Directive, or dependent. Some men assume responsibilities; others evade them.

Original (creative), or imitative. Some men are fertile in making suggestions; others do not possess this quality, but are good at putting them into effect.

Small scope, or large scope. Some men like to fuss with intricate bits of mechanism; others want tasks of big dimensions.

Adaptable, or self-centered. The first might make a good salesman; the second a statistician.

Deliberate, or impulsive.

Manual accuracy or manual inaccuracy.

Mental accuracy (logic), or mental inaccuracy.

Concentration (mental focus), or diffusion.

Rapid mental co-ordination, or slow mental co-ordination. Some men go to pieces in an emergency, whereas if they were given time to consider the situation they hold together and act wisely.

Dynamic, or static. One man may lack push or determination; others having the dynamic quality possess these characteristics.

Little has thus far been said as to the necessity for providing some adequate means of training the men in all of the departments. Its importance immediately becomes apparent in developing a system such as that outlined above. That it pays generous dividends is indicated on such roads as have installed modern apprenticeship systems for mechanical department employees, or have developed educational campaigns for improving conditions and securing greater efficiency or economy in other departments. It is unfortunate that more attention is not being given to this subject by railroads generally.

In this connection allow me to quote a few paragraphs from an address on "Training of Young Men with Special Reference to the Question of Promotion,"* which was given by George M. Basford before a recent meeting of the Burlington Association of Operating Officers.

"To-day we are looking for the genius and are overlooking the production of good workmen. We are depending upon officers. We need to depend upon men. Trained, properly educated and encouraged workmen will provide good officers later.

"Systematic methods of selecting human material for the organization are imperative. The boys in offices, in shops, and all along the road should be most carefully and intelligently selected. Someone well qualified must be given this responsibility. Then these recruits must be tried out, and those 'making good' must be trained. This word 'trained' represents a new meaning as applied in this connection. It means thorough education of hand and brain and conscience.

"Because of the size of a railroad organization it is necessary to provide easy and automatic methods of discovering ability. It is desirable that promotion should be proposed by co-operative action by subordinate officials and controlled by a very high official whose authority is complete in this case. Suppose the president of a railroad could find a man qualified for the duty of directing the training and promotion of men. The difficulty in finding such a man emphasizes the importance of the duty. This man should be given a dignified, powerful position, with such a title as Assistant to the President. He should be responsible for methods of recruiting, methods and means of training men, and for a scheme whereby he will personally know that every promotion is based upon merit, with favoritism and politics banned. He should be responsible for and personally approve every promotion in the entire organization."

Mr. Basford then describes the report cards which were used by Mr. Parish and among other things concludes: "Our Assistant to the President need not personally watch all these cards. He should, however, by frequent checks know positively that every department head is watching them, and he should personally keep the records of all important officials. He should also require record cards for a long period to accompany a recommendation for promotion. For example, a vacancy as assistant superintendent is to be filled. The Assistant to the President would call on all interested departments for recommendations and the office would be filled after an intelligent and complete investigation of all eligible men, including the mechanical and track as well as the operating department. The plan should cover every department."

The scheme suggested by Mr. Basford, if put into effect, would do much to make positions on the railroad more attractive to ambitious young men and would undoubtedly develop means for locating such men in the territory served by the road and of getting them to enter its service.

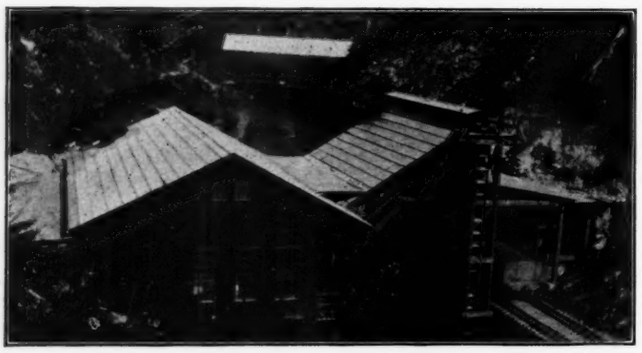
In conclusion the point which I especially wish to make is that it is imperative from the standpoint of future efficiency and economy that each organization should formulate and adopt a policy, which will have the hearty support and backing of the executive officers, as to the selection of men for the different jobs; the proper training of these men in order to make their efforts as effective as possible, and a comprehensive method of selecting men for promotion. If this is done—and it is not a matter which can be accomplished in a week, a month or a year—it will not only increase the efficiency of each individual in the organization to a maximum, but it will encourage loyalty on the part of all the employees and develop an *esprit de corps* which will do much to eliminate friction and labor difficulties and will place any organization which possesses it in an enviable position as to efficiency and effectiveness.

GERMAN RAILWAYS AND THE WAR.—A writer in the London Times, commenting on the important part played by the German railways in war time, describes the ease and rapidity with which huge masses of troops are transported from one front to the other. He says: "Naturally the usual train service in Germany has been considerably reduced. The time-table itself shows a high percentage of trains withdrawn. But the reduced service is perfect, despite the decrease in the number of railway servants, who now include very few able-bodied young men. In the booking offices women are supreme. But trains leave and arrive to the minute, and provide the usual accommodation. There are sleeping and restaurant cars on the important expresses between the principal cities. All the German railways are now worked on one single system, which has been extended to the whole of Belgium under German occupation, as well as to the occupied portions of France and of Russian Poland. Direct express trains, with sleeping and restaurant cars, run from Berlin to Metz-Charleville-Mezières. Similar trains run to Brussels and Lille. With a special permit a civilian can travel there just as he can travel eastward to Lodz. The German time-tables tell him when he can reach places as far west as Noyon, Laon and Chauny. In fact, the organization is such that, notwithstanding the heavy military burden on the railways, one can travel amost as freely and quite as punctually as if there were no war. In certain towns and fortified areas your passport may be required, but that is all."

*For full text of address see *Railway Age Gazette*, July 23, 1915, page 15.

VENTILATING THE STAMPEDE TUNNEL OF THE NORTHERN PACIFIC

Late in March the Northern Pacific placed in operation a ventilating system at the Stampede tunnel, which required the solution of a number of unusual and interesting problems. This tunnel is located on the main line to the Pacific Coast, at the summit of the crossing of the Cascade Mountains, about 75 miles east of Seattle. The approach grade on the west is 2.2 per cent. for several miles, reducing to 0.7 per cent. at the west portal. On the east slope there is a 2.2 per cent. grade for five miles,



General View of the Ventilating Plant with the Power House in the Foreground and the Fan House in the Rear

changing to 0.2 per cent. at the east end. The summit of the grade is a short distance east of the center of the tunnel, which is 1.95 miles long.

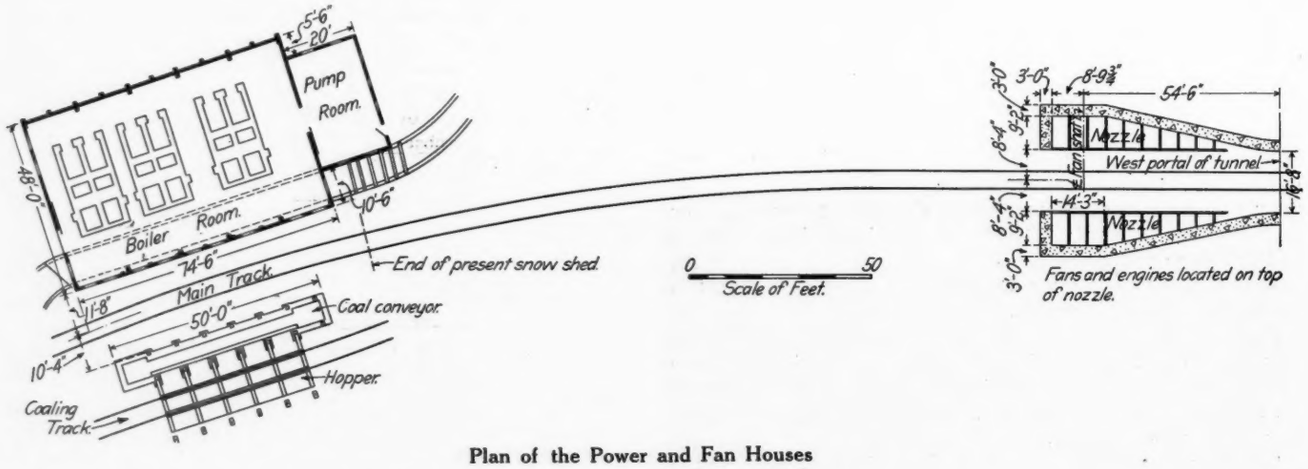
An average of 10 passenger and 10 freight trains pass through this tunnel daily. Most of the passenger and all of the freight trains require helper engines. The rating of freight trains is 2,850 tons westbound, and 2,400 tons eastbound. Such trains are hauled by large Mallet road engines, assisted by two smaller Mallet pusher engines, one of which cuts off at the portal of the tunnel and the other passes entirely through it. The helper engines in freight service drop back to the foot of the grade at each side after assisting trains over the summit, while the passenger helper engines go through from Easton, at the foot of the slope on the east, to Lester, at the bottom of the heavy grade on the west, and vice versa.

This frequent train and helper movement created smoke conditions which made relief necessary. The portal at each end is located in a ravine. This fact, combined with the presence of the summit of the grade midway in the tunnel, caused the smoke to remain in the tunnel for considerable periods of time, especially when the wind was in certain directions. Even more serious was the heat problem, the temperature frequently rising to 150 deg. The substitution of oil-burning locomotives on freight trains two years ago relieved the smoke conditions somewhat, but did not lower the maximum temperature appreciably.

To relieve traffic conditions on these heavy grades over this mountain a second track has been constructed between Lester and Easton during the last two years, the only break in this being through the tunnel, which is still single track.

In considering the design of a ventilating system at this point, the most serious problem presented was the length of the tunnel. Previous installations have been made in tunnels varying from one-half mile to one mile in length. The Stampede tunnel is almost two miles long. This at once raised the question whether a sufficient nozzle velocity could be obtained to drive the air through the entire length of the tunnel with a train in it with a reasonable expenditure of power. After careful consideration it was decided that such a method required one of two alternatives, either operating the trains slowly to keep the smoke ahead of them by the expenditure of a reasonable amount of power, or if trains were run at their normal speed, the expenditure of a greatly increased amount of power. It was finally decided that the plant should be designed to clear the tunnel of smoke in approximately six minutes after a train had passed through. This insured that every train would enter a clear tunnel, and, also, if for any reason it was stalled in the tunnel the fans would have sufficient capacity to keep the smoke moving through the tunnel, supplying the crew with fresh air.

The presence of the summit of the grade, a short distance east of the center of the tunnel presented another problem. Theortically, a set of fans would be required at each end, so that the smoke could be driven ahead of a train running up grade in either direction. As it was finally decided to clear the tunnel of smoke after the train passed through, the usual procedure was not followed and only one plant was constructed. As the prevailing natural direction of the wind was eastward it was located at the west portal. It was designed to furnish 540,000 cu. ft. of free air per min. at a velocity of 1,700 ft. per min. in the tunnel. The required impact pressure at the nozzle discharge was figured at 4.2 in. water gage. The general type of the nozzle adopted is that devised a number of years ago by Charles S. Churchill and C. C. Wentworth, of the Norfolk & Western.



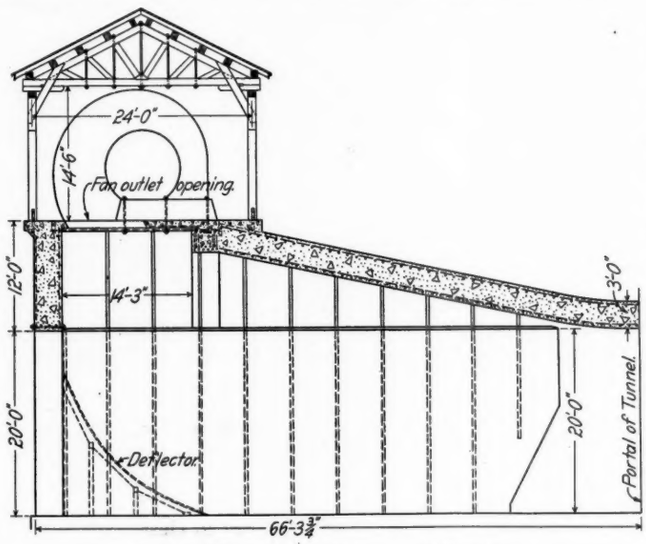
Plan of the Power and Fan Houses

As stated above, the west portal of the tunnel lies in a narrow ravine. For this reason, while the fan house is located directly over the portal it was necessary to locate the power house 250 ft. back along the track. On the side of the main track opposite the power house, is a short side track leading to a trestle and coal hopper. Coal for the power house is received here and unloaded into pockets. From the pockets it is carried up and over the tracks by a link-belt bucket conveyor and deposited in storage bins directly over the main tracks with a capacity of 450 tons.

The power house is located across the main track from the coal hopper. It contains five Babcock & Wilcox 150-h.p. boilers

equipped with Jones underfeed automatic stokers feeding directly from the storage bins. Auxiliary apparatus includes a No. 12 Sturtevant "Multivane" induced draft fan, driven by a 7-in. by 7-in. vertical engine, a Hoppes feed water heater, and three 12-in. by 8-in. by 12-in. Dean pumps, one of which is for the feed water heater, one for the boiler feed, and one as an auxiliary so connected that it can replace either of the other two.

Steam is conducted from the boiler room to the fan house through a 10-in. steam line. The ventilating equipment consists



Section Through Fan House and Nozzle

of two No. 22 Sturtevant "Multivane" fans, each fan being driven by two 16-in. by 16-in. Sturtevant horizontal center crank engines, direct connected. The fans are 16 ft. long by 14 ft. high and 7 ft. wide, and operate at 220 revolutions per minute. The fans and engines are mounted on a concrete platform carried on a concrete arch over the tunnel.

The fans force the air vertically down onto a deflector, from which it passes into the nozzle. The nozzle is 50 ft. long and 19½ ft. high inside at the rear, reducing to an 8-in. opening at the top and 14-in. on the bottom at the outlet, which gives a total outlet area of 52 sq. ft.

The outer wall of the nozzle is of concrete 3 ft. thick, while

View of the Fan House Over the Tunnel Portal

the inner wall is of 5-in. tongue and grooved timber anchored to the concrete by ½-in. by 3-in. flat steel bars spaced 6 ft. horizontally and 4 ft. vertically. A damper is placed below each fan so that it can be shut off completely when out of service.

This plant was built by force account during the winter of 1913-14. Over 1,000 cu. yds. of concrete were required in the construction of the nozzle and the engine base. Because of the very limited amount of room available and the necessity of preventing all interference with main line trains, since a westbound train would have to stop in the tunnel and an eastbound train on the ruling grade, the concrete was mixed at the site of the coal dock. It was then hoisted by an Ensley system of spouts and dumped into small cars running on the top of the snow shed extending over the track between the boiler and fan houses. All of this concrete was put in in two weeks, as much as 130 yds. being placed in a single day. During this same time all concrete material had to be unloaded directly from the main line.

The fans were installed during last year. Recent tests showed that they are delivering 540,000 cu. ft. of air per min., with an impact pressure at the nozzle outlet of 4 in. Tests made with a freight train moving at a speed of seven miles per hour showed that the smoke was driven ahead of the train and the temperature did not exceed 100 degrees.

This installation was designed and built under the general direction of W. L. Darling, chief engineer, by S. J. Bratager, principal assistant engineer, in conjunction with F. Herlan, district manager, B. F. Sturtevant Company, Boston, which company furnished the equipment. T. Z. Krum was assistant engineed, and B. C. Rowell, resident engineer on the ground for the railroad company.

THE FARMER AND THE RAILROAD

By Philip Meinen
Farmer, Stites, Idaho

One reads much nowadays in almost every newspaper in the country about farmers urging legislation to lower freight and passenger rates. Before going any farther I wish to say that I am not a railroad man, but am a farmer and believe in justice between man and man or man and company, regardless of wealth on either side.

Now, to begin with, the first thing a farmer will say is that the railroads are making too much money, basing his argument on something he has read somewhere or that someone has told him who doesn't know any more about fair rates and profits than he does, but who is urging lower rates only to be a good fellow and get subscriptions for his paper.

To be frank, we need both the farmer and the railroad company. I say company because many would say let the government handle the railroads. I don't think the government should go into the railroad business and you don't either if you have ever given it any observation and thought.

Let's not overlook the consumer, as he is the prime factor to both the farmer and railroad. Without him the farmer couldn't sell his products or the railroad do any transporting, and his sympathy is not altogether with us farmers, as he accuses us of getting too much for our hogs, cattle and grain and is employed by railroad companies or other city industries for his livelihood.

I have heard farmers remark that the cost of living is too high for the poor people in cities and should be reduced by cutting freight rates and cutting out the middleman's profit. Well, there might be something in that, but we don't do it when we have a chance. For example, at present I am living in the state of Idaho. In the village where I live the farmers have a co-operative creamery running the third year now. They were going to furnish cheaper butter by cutting out freight rates and also middlemen's profits. Before this creamery was there they used to ship their cream to Spokane, Wash., a distance of 195 miles, and ship the butter back. Now they have saved dray charges at both ends of the line, saved middlemen's commissions at both ends and also saved railroad charges both ways, and the result is that we pay the same price as usual, and at times a little more, so there is not much sincerity to the cheaper butter question.

A short time ago I noticed in some paper where a spokesman for the farmer came before a hearing on freight rates, stating that the railroads were getting from six to nine per cent on their investment. He claimed that this was too much

as compared with the farmer who was getting only from three to four per cent on his investment, and further, that the average farm investment in the state of Iowa was $17,000, and that a man could only earn $600 a year on that investment, declaring that a man capable of handling a $17,000 investment was worth more than $600 a year.

Now surely there is something wrong besides high freight rates. Let's investigate. In the first place, if any man who has $17,000 invested in a quarter section of land can only make it pay him $600 a year there is something wrong with the man or the land. If he is not a farmer and does not understand farming thoroughly, as many of us do not, it's the man's fault. On the other hand, if he has paid $17,000 for a quarter section where the land is not worth more than $10,000 a quarter section that makes a difference in figuring interest on an investment.

The fact of the matter is this: we have all been anxious to have a farm of our own, thereby causing land prices to rise by high bidding. We'll all have to admit that land is selling too high, which makes it bad for the renter who has to pay higher rent so his landlord can make reasonable interest on his high-priced land, or if a man is buying a farm for himself to live on and has to go in debt for most of it, it makes quite a difference whether he has paid $100 per acre or $50 when it comes to figuring interest and revenue on investments. When people get excited over land and pay a great deal more than it is really worth somebody is going to be dissatisfied sooner or later. The selling price of land isn't always the actual value. We have numerous instances of this everywhere. If you have made a bad buy or are a poor manager you might have free railroad transportation and still make a failure of farming. So let's use a little sense and not shift our poor judgment on the railroad company which has nothing to do with it. We are always ready to blame the other fellow when really the fault is our own.

We shall all have to admit that the railroads have helped the farmers more than anything else could have done, by giving them better transportation and cheaper transportation than we used to have in early days when the freight wagons used to be the only way.

Now it is a fact when we go into any country as a homeseeker or for any other business requiring cheap transportation the first question we ask is, "How far from a railroad?" If very far out we usually do not give it any attention, and if we do invest the saying is this, "Well, I got it cheap and will hold on until we get a railroad that will open up a good market for us and then our land will be worth something."

I want to tell you about another case of freighting the old-fashioned way in the state of Idaho, with which I am thoroughly familiar. In the village of Stites the Northern Pacific Railroad has a terminal. The surrounding country is fertile farming land, but 52 miles up the river is a large mineral belt. The mineral belt has no railroad transportation and the old-fashioned horse freighting is too expensive for the mining companies. So they will have to wait until the railroad is extended, which will then open up a great mineral and timber belt and also a great market for us farmers to sell our products to the mining companies at a good price and create labor of all kinds where there is nothing doing now of any importance. I have made the remark many times myself, and have heard numerous farmers make the same remark, that if the railroad should ever be extended to Elk City, which is a small mining town, this would be one of the greatest countries in the Northwest for the farmer, miner and lumbermen.

These are facts, as I am in a position to know. Then why should we encourage a railroad company to spend several million dollars to build, which it would cost at the very least, as it is an expensive road to build, and then come right back at them and say: "You are making too much money, you will have to cut your rates," after they have spent their money in good faith and to the great benefit of the public. Take it with ourselves. Suppose we bought a bunch of hogs or cattle and were asking a handsome profit on our risk and investment, and the consumer was to come along and say, "No, I can't afford it and furthermore you are making too much on them, you will have to sell them for so much; if you don't we will have to legislate against you." That would be just as fair in the eyes of good reason as going against railroad companies.

Of course this horse freighting does not appeal to the farmers of the Middle West and older settled States, but is still in existence with us in the West to a certain extent. A short time ago I was talking to an old settler from north central Kansas. He was telling me of earlier days when they used to haul corn to Denver, Col., a distance of 500 miles by wagon before they had railroads, and of the hardships they endured, and the prices of their stuff were not any better at that time than they are to-day. And it is from those days that we must figure our rates. Figure the price they received in those days and the cost of hauling, and then figure the price you get now and the rate you pay now. Compare them, and see which you like best, and which is the most profitable to you.

This talk of someone making too much money is no argument. That is mere jealousy, and we don't want to class ourselves with that class. Let us be brighter and broader. Well, you say, the railroad companies are all getting rich. That may be true, but look at the amount of business they do. If their profits are small, or we will go a little stronger and say reasonable, the immense business transacted would make anyone rich. It would be the same if a large number of farmers combined and formed a company, provided they could agree, which is hardly ever the case. If they would buy immense tracts of land and would manage their business as systematically as the railroads do they would also become very rich, not necessarily from large profits, but from the large amount of business done. It is a well-known fact that the railroad officials thoroughly understand their part. If they don't they don't hold their positions long. If we farmers would spend more time studying our own affairs instead of the other man's it would be better for us. It would purify our minds and teach us better management and also how we can produce more per acre, as that is the coming big question.

Now, in conclusion, I wish to say that I don't want you to think that I am giving the railroads all the credit and the farmer all the blame, but there has been a great amount of unnecessary complaining by the farmer. Whenever it is necessary and possible to lower rates the results are usually accomplished by the proper persons applying to the proper authority. What we should do is to have a get-together good old time oftener, and get better acquainted with one another, and that ill-feeling would not exist so much. There are good men on both sides, and if we understood one another better the feeling would be more friendly and it would be beneficial to everybody concerned. So let us break away from the old idea of playing the other fellow for a robber and a crook when we are just as much to blame.

RAILWAY EXTENSION IN THE CANTON PROVINCE OF CHINA.—A recent British Consular report says that little railway construction was undertaken in Canton Province during 1914. The Canton-Hankow Railway at the end of the year was open as far as Wu Shek, a distance of 121 miles from the Canton terminus. It was hoped to complete the next section of 19 miles to Shiukuan by May last. The total length of the section to be built by the Canton Company is 214 miles, which will take the line to Ichang, just across the Hunan frontier. Prospects of a continuation beyond Shiukuan in the immediate future without outside assistance are remote, as capital is said to be exhausted. Receipts more than cover expenses and upkeep, and are expected to increase considerably with the extension of the railway to Shiukuan. The Canton-Samshui Railway, though only 32 miles long, has had a good year in spite of damage done to the roadbed by floods, which, for a considerable time, stopped traffic six miles from Samshui.

Precedent Versus Progress in the Stores Department

Excessive Increase in Unused Material Due to Adherence to Precedents in Methods of Control and Accounting

By George G. Yeomans

The investment of the average railroad in unused material is rapidly increasing. In 15 years it has increased 283 per cent. This rate is out of all proportion to the increase in any of the units of operation, which render a stock of material necessary.

The official figures of the Interstate Commerce Commission show the following increases to have taken place during the same period:

Miles of track	50 per cent.
Freight car miles (10 years)	50 per cent.
Total car miles (partly estimated)	57 per cent.
No. locomotives in service	70 per cent.
No. cars in service	82 per cent.
Tons moved	167 per cent.

Reduced to a "per mile of track" basis, the percentage of increase is as follows:

Unused material	155 per cent.
Freight car miles (10 years)	10 per cent.
Total car miles (partly estimated)	15 per cent.
No. locomotives in service	14 per cent.
No. cars in service	21 per cent.
Tons moved one mile	77 per cent.

Why this enormous discrepancy in the growth of the fixed investment in material?

It must be distinctly borne in mind that this is not an increase in the amount of material *used,* but in the amount of material that is not used and which represents a practically permanent investment.

This distinction is important. Consumption of material should be expected to increase in greater ratio than the units of operation referred to, because railroad operations themselves have greatly increased, both in magnitude and complexity. But a stock of material should not increase in direct proportion to the amount consumed, and, while it could not perhaps be altogether limited to the same ratio of increase as those units with which it is here compared, it is reasonable to assume that so great a difference is wholly unwarranted.

It is unfortunate that more exact information on this subject is not procurable. The units with which comparison is instituted are not those of choice, but of necessity, and the comparison is therefore crude, but the discrepancy between cause and effect is so tremendous as to demand serious consideration.

I do not know a railroad executive who will not admit that this investment is larger than it should be, and who is not trying in some way to curb it, but it is evident that the average way is not the right way, for the disproportionate increase continues. A detailed examination of this situation on ten representative railroads in various parts of the country, coupled with results actually obtained in several cases, point to the conclusion that this investment is nearly twice as large as is necessary on the average railroad.

The amount of capital thus impounded is reported as $240,000,000, and this is undoubtedly the minimum. If 40 per cent of this money could be recovered, there would be $100,000,000 more of free capital to employ for other purposes.

Analyzed further, this means that the railroads, collectively, have unconsciously expended $100,000,000 for which no real necessity existed. True, it is not lost. The material which it represents will be used some day or, at least, most of it; but it is idle capital and that means expensive capital. When locked up in stocks of material the carrying charges are seldom less than 15 per cent, and frequently as high as 20 per cent. Thus a further expense of some $15,000,000 or $20,000,000 is caused, which is wholly unnecessary.

Why do such conditions exist, and what is the remedy?

Two principal causes contribute to this economic waste and prevent its correction.

1. Absence of exact information regarding the handling of this large investment.

2. A reluctance to depart from long established precedents and customs.

It has come to be generally accepted that the first step toward positive control of this large investment is the creation of an organization to which can be entrusted the care and handling of the stocks and the collection of accurate data concerning them.

Following the example of the pioneers in this reform a majority of the railroads have instituted a "Stores" department, but, as a rule, have placed it in charge of employes whose previous training has all been along the lines of former practice and, through an imperfect conception of the basic principles underlying the effectiveness of such an organization, they have condemned all departures from precedent and expected different results without employing different methods.

Under such conditions the work of the new department has been perfunctory and superficial, for no matter how those in charge of it may strive, they are bound by the dictates of precedent and custom. They must also contend against a natural jealousy over what has come to be regarded as a "vested right" of the individual or the department in the material they use and an equally natural resentment of what is construed to be an abridgment of long enjoyed authority.

The insignificance of the results obtained under these conditions creates a disbelief in the efficacy of the remedy.

The methods of controlling the investment in material are the only ones that have stood still, on the average railroad, since its inception. They are essentially the same today as when the "Stourbridge Lion" made its first trip.

The efforts at improvement have been mainly directed to facilities for the physical handling of the material, which have an important effect on the labor cost, but none at all on the amount of the investment; unless, possibly, to still further increase it.

It is hard to understand why we cling so tenaciously to customs which have produced the very condition which we seek to correct, and blindly follow precedents established under circumstances that no longer exist, but until we realize that they have outlived their usefulness and are ready to discard them in favor of methods which are better adapted to the changed conditions of modern railroad operation, this unproductive and costly investment will continue to increase.

The only methods by which the stock of material on a railroad can be controlled are the same, in all essential particulars, as those employed by any large and successful department store or mail order house. The same basic principles apply in both cases. It is purely a commercial problem, not one of operation or engineering. There must be the same precision of method, the same accuracy of data, that are necessary to the profitable conduct of any commercial business. The law of averages holds just as good in the consumption of material for the ordinary maintenance and operation of a railroad as in any other field of human endeavor, and this law should be intelligently applied in procuring and limiting the supplies for such work, but the averages must be founded on precise and comprehensive knowledge, and not on estimates or imperfect or incomplete information.

Precedent has decreed that the amount of material to be carried in stock shall be determined by the user. The argument is that he is the only one who can decide what his requirements will be. The fallacy lies in not differentiating between

his requirements for immediate use in a given case, and the amount which should be provided for future use in a given period. A sharp distinction must be drawn between these two requirements, for they are essentially dissimiliar.

When an engineer is deciding on the strength of a structure, or, in other words, determining the amount of material to be used, he ascertains the ultimate stress to which the members will be subjected, but he does not stop there and perfect his plans. He proceeds to multiply this strain by 4, or perhaps by 5, as a factor of safety, and often adds 5 or 10 per cent to the total thus obtained to cover contingencies and possible errors in calculation.

I am not criticising this practice as it applies to engineering, but I do say that men whose life-long training is along such lines are apt to use similar methods in determining the amount of material to be provided for future use and this is one reason for the discrepancy which has been pointed out, and a partial explanation of the fact that the most disproportionate stocks are usually of material used by the roadway and bridge departments. If the stock of a mercantile establishment was regulated by the estimates of its customers, it would speedily meet with disaster.

Adherence to precedent is also responsible for the lack of exact information, which is one of the primary causes for failure to control the investment in material.

The exigencies of the work demand that material be kept in readiness for use in a multipilicity of places, not only at widely separated points on the line, but at numerous places within the confines of a single large shop or terminal. The custom has been that the labor of handling all this material, which is not in the immediate vicinity of the storehouse, shall be performed by labor gangs in charge of the user.

The physical handling of a stock of material is vital to an accurate accounting, either for its receipt or distribution, and the greater the number of individuals entrusted with it, the less is the likelihood of uniformity and accuracy, and the greater the chance for error and confusion.

Where this custom prevails there is no real precision in the accounting for material, and without this, any adequate regulation of the investment is hopeless.

It is said that the user is responsible for the costs of the work under his jurisdiction and therefore must have entire control of everything entering into them. Granted. But the stock of material never does enter into his costs. The minute it is used, it ceases to be stock, and it is the stock we are dealing with.

The most potent argument for the retention of this pernicious custom is that the work is done by men already on the pay-roll and who could not be dispensed with, and that a separation of the work would involve additional forces and an increase in the labor cost. This argument is very insidious and is too seldom subjected to close analysis. The main difficulty with it is that it is not true. It springs from the very lack of exact information, which the custom itself is accountable for. Where this practice is followed, the actual cost of handling the material is not known, and to say that it will be increased is merely stating a conjecture as a fact.

In every instance where the experiment has been honestly tried the reverse has proved true, and the labor cost has actually been reduced; in most cases sufficiently to cover the added expense which is inseparable from a more precise system of accounting.

It is customary in many places to permit the users to withdraw material from the general stock in anticpiation of possible future needs, or as a matter of convenience. This custom is prejudicial to the service. It is an effort to compromise between bad precedent and good practice. It results in duplication of stocks and of labor, complicates the accounting, tends to destroy its accuracy, and renders effective supervision and control of the total investment difficult if not impossible.

The cardinal principles which form the foundation for successful control of this investment on a railroad are as follows:

1. The creation of an organization devoted exclusively to that purpose and free from authoritative control of the user, except as to the kind and quality of material to be provided. In that respect the user is supreme, as is the customer in any well-regulated mercantile business.

2. The jurisdiction of this organization must extend to all material not in actual use, and all material released from service for any cause must automatically return to its control.

3. This organization must procure the requisite material from all available sources, including the company's shops, must limit the supply to the actual requirements and be prepared to deliver to the user on demand all ordinary supplies for maintenance and operation, and on reasonable notice all unusual or extraordinary material for betterment or construction.

4. It must have direct charge of all labor necessary for receiving, warehousing and distributing all materials to the user. This is essential to precision in accounting.

5. It must install a system of accounting under which the material is so classified as to facilitate rigid supervision of the amount invested, and so precise in detail as to render supervision of the numerous items effective.

Precision and the inclusion of all material, both in handling and accounting, are the keys to the control of this investment, and one is the complement of the other. To be effective they must be united under a single supervision.

Precision generally involves increased expense and this has been a stumbling-block in the pathway of many who are conscious of doing the best they can, and who cannot convince themselves that the benefit to be derived from more exact methods would be sufficient to pay the added cost. On the other hand, many railroads have recognized its value and made liberal expenditures for more accurate accounting, but have unfortunately followed the line of least resistance when any radical departure from precedent was in question, and have therefore reaped only part of the benefit to which their increased expenditure entitled them.

The few who have studiously analyzed the whole situation in the light of present conditions and have courageously followed their analysis to its logical conclusion, have attained results that they did not orginially dream of. These results are not frequently published, because of the reflection they cast on former methods, but they are very real, and they confirm the conclusions previously stated.

The net earnings on one railroad coming under my observation were increased $1,500,000 in one year, and an average increase of more than $750,000 was maintained over a period of five years, while the unproductive investment in material was reduced more than 45 per cent, and yet this might have been classed as an average railroad.

There is no reason why the same progress should not be made in handling the investment in material that has characterized every other field of railway operation, but in order to accomplish it, we must abandon the precedents and customs which are mainly responsible for this economic waste, and set up new standards, adopt new methods, establish new precedents; for we cannot reap the highest rewards of progress while we continue to live in the past.

A New Indian Railway.—The Kalighat-Falta Railway Company will complete a 26-mile 2½-ft. gage railway from Kalighat to Falta, Bengal. The line will run through one of the most densely populated parts of Bengal, the density of population being more than 1,100 per square mile. This is more than double the average density of Bengal, which is 551 per square mile. The only present means of passenger transportation is by hackney carriage or on foot. Almost every foot of the ground through which the line runs is under cultivation, and the only means of transportation heretofore has been the bullock cart, wherefore it is estimated that the freight traffic will be immense.

CANADIAN PACIFIC DRAW SPAN OVER THE LACHINE CANAL

A new electrically-operated double track deck plate girder swing bridge over the Lachine Canal, near Montreal, Can., has recently been opened for traffic by the Canadian Pacific. This bridge is said to be the longest plate girder swing span in existence and is of interest also because of a number of unique features embodied in the design to overcome physical obstacles and to permit rapid construction with minimum interference with traffic. The old structure consisted of a 240-ft. through truss swing span over the canal with a 45-ft. deck girder approach span on the south end to accommodate a highway which is a continuation of St. Patrick street, Montreal. The completion of the double track bridge over the St. Lawrence River, and the double track work between Montreal and Brigham Junction a year or so ago, left this bridge as the last remaining single track structure, necessitating the use of gauntlet tracks over it. Because of the consequent delays to trains, authority was granted in the fall of 1914 for a new double track structure.

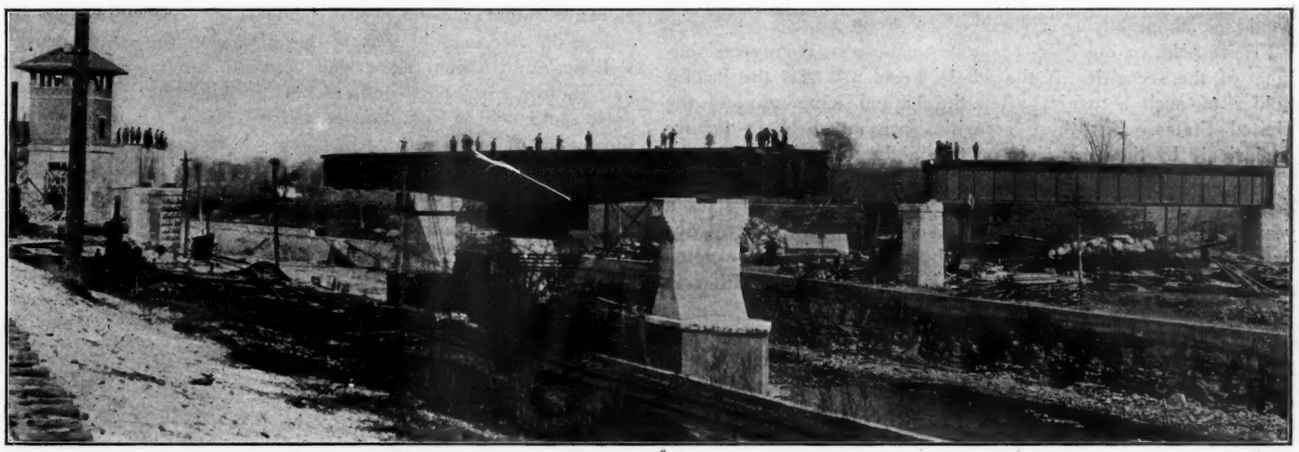
The old bridge was supported by a cylindrical pivot pier 18 ft. in diameter and 49 ft. high from top of coping to the rock in the bed of the canal. There were also one intermediate pier and two "T" abutments, all of ashlar masonry. Although the pivot pier was rather narrow for a double track structure, objections to narrowing the waterway of the canal precluded the construction of a new pier of greater width. Preliminary studies indicated that a deck structure for the new bridge would simplify the erection. It was also found desirable to provide for a railway track passing under the bridge on the south bank of the canal, thus necessitating an increase in the approach span from 45 ft. to 90 ft.

The girders of the new swing span are 239 ft. 7 in. long and 13 ft. 6½ in. deep at the center, reducing to 8 ft. ½ in. deep at the end, measured back to back of flange angles. The girders for each track are spaced 8 ft. center to center, with tracks 13 ft., center to center. They are supported at the pivot pier on a grillage of loading girders about 8 ft. deep, which transmit the load to a combination center and rim bearing. The total weight of the swing span is 615 tons, while the 90-ft. approach span weighs 143 tons.

The renewal of the superstructure involved extensive changes in the substructure. It was necessary to cut down the pivot pier practically 20 ft. and then provide a new coping with a width of 23 ft., to accommodate the deck girder spans. The north abutment and the intermediate pier had to be increased in width to accommodate the second track. The old south abutment was entirely removed and a new abutment was built a sufficient distance back to provide for the new 90-ft. span. In order to avoid provision for turning the old bridge during the construction of the masonry it was necessary to do all construction work during a short time in the winter, while navigation was closed on the canal. This necessitated the perfection of arrangements to do the work at the greatest possible speed. Work on the masonry was started December 1, 1914, and was ready for the erection of the steel work on February 8, 1915, the work being carried on by day and night shifts most of the time.

In order to facilitate erection, the old draw span was altered a sufficient amount to permit erection of the center, the loading grillage and the main girders on the upstream side. By this plan it was possible to divert traffic to these girders while the old span was demolished and the girders erected on the downstream side. This operation eliminated the necessity for a temporary structure to detour traffic around the bridge while erection was in progress. The four main girders, each of which weighs 112 tons, were shipped in three sections by the builders, the Dominion Bridge Company, to facilitate handling and shipping. This necessitated field flange and web-splices, which were riveted up after they had been lowered into place by heavy derricks. The new span was operated by hand power for the first time on March 31. The double track was put in service on April 3, while operation by electric power was commenced on April 15.

The bridge is protected by a 16-lever mechanical interlocking machine with power-operated home signals and electric track circuit locking, and is controlled from a signal tower of fireproof construction, supported on an extension of the north abutment. The structure is also provided with a system of lights as required by the Board of Railway Commissioners, for the protection of shipping on the canal. The new type of bridge gives a much clearer view along the track than formerly, as there is no overhead lattice work projecting above the rail level, and the tower commands a view up and down the canal even when trains are passing over the bridge. The bridge was designed and erected under the supervision of P. B. Motley, engineer of bridges, and J. M. R. Fairbairn, assistant chief engineer.



View of Draw Span in Open Position

LINKING-UP THE SUB-CONTINENT.—General Botha's victory in the territory heretofore known as German Southwest Africa is of great significance to railway men, for it will doubtless mean the eventual linking-up of the railway systems of the sub-continent in a way that was not possible under the old regime. Thanks to the enterprise shown by the Railway Administration of the Union of South Africa in hastening the construction, firstly, of the Prieska to Upington Railway line, and, secondly, the extension thereof to Kalkfontein, north of Warmbad, in German Southwest Africa, the work of linking-up has already made material progress, and it is now possible to travel—by a somewhat circuitous route, it is true—by train from one side of the sub-continent to the other—from Luderitzbucht, in German Southwest, to Lourenco Marques, in Portuguese Southeast, taking Kimberley and Johannesburg en route.—*Railway Gazette, London.*

HOW AND WHY FRENCH RAILROADS SELL THEIR SECURITIES DIRECT TO THE PUBLIC

By Walter S. Hiatt*

Is there not a lesson for the railroads of the United States in the way the French railroads sell their securities over the counter to the investing public, thus making easy such investment on the part of people of limited means? Just now the important problem before the American railroad financier is the raising of new capital for railroad development and for the refunding of securities maturing. This problem is all the more difficult because of the return of American railroad securities by crippled European investors.

I am certain that the average small investor in the United States, the person without any financial knowledge, the person who generally in a small town or city puts his money on deposit at the local bank and often without interest or else in the private savings bank or those of the post offices, hasn't the slightest information as to how to buy a railroad stock or bond. Suppose this person with $50 or $100, a few hundred dollars at most saved up, would like to buy outright a share or two of railroad stock. Suppose the desire, the inclination is there, what can he do? If he has a friend in a broker's office or in some bank, he may be permitted to buy as a personal favor. This is a condition that exists, as any one can find out by asking the first acquaintance of moderate means he meets in the street how he would go about buying a share of stock or a bond.

France held, or did hold, previous to the war, twenty odd billions of the securities of the whole world. It was the largest holder of such securities after the United Kingdom and the United States. But these securities are not held in France exclusively by the very rich, or the moderately rich, as in the United States. They are held as well by the moderately poor people, by the salaried clerks who earn a thousand dollars a year, by the people who have retired on an income of five or six hundred dollars a year. Although the French are noted for their thrift, their saving bank deposits are small, either in the private or the government savings banks—a little over a billion dollars, as compared to the five billions found in like banks in the United States.

One of the favorite purchases of those whose savings are small is French government bonds. Why? Because the government makes it easy for them to make the purchase. These bonds are put out in $20 lots. Generally they pay two and a half to three per cent., but just now they are paying five per cent., and about a third of the bill board space of France is plastered to publish the fact.

French railroad securities are also a favorite with the small investor. Why? First, possibly, because the railroads have nearly always paid good dividends, and then because they have made it easy for the small investor to buy. All the investor has to do is to walk into a railroad general office, either in Paris or in some other city along its line, go to the proper window, hand in his money and walk out with his security. He doesn't have to go through the mysterious medium of a bank or a broker's office, though, of course, these latter places sell railroad securities too. Undoubtedly this method of selling railroad securities is a direct benefit to the railroads, in that it makes the public take an interest in their welfare, and then there is the general benefit to the public in that saving itself is encouraged.

Of course, one of the reasons that the railroads are able to sell freely and obtain new capital is that they have the confidence of the public. Only recently I was in the Paris central offices of the Southern Railway (the Chemin de Fer du Midi) and saw posted up a notice that it was issuing new bonds at 3 per cent. People, men and women, were buying them at the proper window just as they would hardware or drygoods. It was surprising that people should be doing this in war time, when financial markets are troubled and when the end of the war is yet distant. I asked the clerk selling the bonds how it happened that people bought so freely. "Oh, they know we have paid our dividend as usual this year; then they see how we are quoted at the Bourse and know we are offering a good bargain," he explained. "Many of these buyers are our regular customers. They had bonds that we have redeemed this year, so they take this money and put it back into new bonds."

One of the odd sides to this method of dealing directly with the public lies in the fact that that part of the public which has large means prefers to buy of the railroad rather than of bankers and brokers. In past years this latter class has flagrantly betrayed the confidence of the French public, first, in refusing credits to legitimate business, and second, in foisting upon it unsafe securities of North and South American railways.

An agent of London Lloyd's told me recently this story. He happened to be in Paris one day and called on a banker he knew. As he entered the bank he saw a long line of people. "What's the matter? Is there a run on your bank?" he asked. "Not at all, we are putting out a thirty million franc issue of railroad bonds," and the banker mentioned a South American railroad. "But do you know what you are selling? Have you investigated that road?" asked the Lloyd's man. "Certainly," said the French banker. The railroad at the time of this issue had just one engine, a few flat cars and five miles of sloppy track.

The question here raised as to whether standard American railways might not do well to adopt the French system of selling directly to the public is raised because the system works well here and should work well with the American public. In past years a small part of the American public has been encouraged too much to speculate in railroads and the great public, the public of small means, has never been made to look upon them as objects of legitimate investment; or, when the public was given an opportunity to invest, it was in some new railroad scheme that too often wiped out the original investors. The banker was the only holder whose money was secured.

The problem before the American railroad is one that, intricate as are its details, involves, first of all, common sense. The railroads have in late years got down, though tardily, to common sense in dealing with the public in matters of service, and why not deal with this public on the same basis as regards finance?

How rare are the small holders of railroad securities in the United States is astonishing. Let me cite this incident. Two years ago I was present at a meeting of business men of Hoboken and Jersey City, New Jersey, a railroad terminal for many years of the Erie, the Lackawanna, the Pennsylvania, and other railroads. These business men wanted to secure certain minor concessions affecting the interests of the people living in Hudson county. It was moved that a committee be appointed to call upon the local railroad managers. "But they won't listen to you," argued one man. "We've tried that before." "I know a way to make them listen," said one of the men present, a manufacturer. "I own stock in these roads and when I tell the managers that they'll listen all right."

The fact that he owned stock in these roads surprised everybody present, and they then agreed that there was some chance of getting what they wanted. As a matter of fact, when the stock owner disclosed this ownership to the railroad men, he was listened to most respectfully, and he did get what was asked for. Afterwards the manufacturer and stock-owner laughingly told me that he owned but one share of stock in each road, stock that he had bought as a present for his oldest son, as a sort of nest egg, to encourage him to save his money and buy more stock.

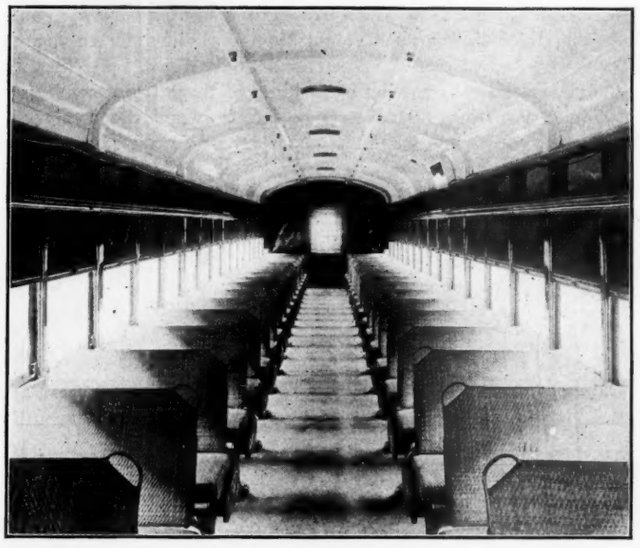
* Our special European correspondent.

Austro-German Sleeping Car Company.—According to Amsterdam advices negotiations are taking place in Berlin for the formation of an Austro-German Sleeping & Restaurant Car Company. Up to the present the Wagons Lits Company, of Brussels, has operated this traffic in Germany.

Steel Coaches for Long Island Suburban Service

For Summer Service Only; Exceptionally Low First Cost and Light Weight Obtained by Building Without Lining

Passenger traffic conditions are such on the electrified lines of the Long Island Railroad that a considerable increase in equipment is required during the summer months, amounting to about 25 per cent of the equipment in service during the remainder of the year. In the design of an order of 20 trailer cars built by the Standard Steel Car Company and recently placed in service, full advantage has been taken of these conditions not only to produce a car of exceptionally light weight, but to secure a maximum carrying capacity for a moderate outlay and to reduce to a minimum the investment tied up in idle equipment during the winter months.



Interior of Long Island Steel Trailer Cars

The use of trailers was decided upon after a general survey of the traffic and operating conditions, it being estimated that three trailer cars could be built for approximately the cost of one fully equipped motor car. Furthermore, where motor cars only are used, if the conditions are such that during a part of the year only a portion of the cars are needed, the service must be distributed over all the cars to provide for proper inspection and maintenance of the electrical equipment.

A number of restrictions were imposed upon the design at the outset. The Long Island class MP-54 motor cars with which the trailers are to operate are each equipped with one motor truck driven by two Westinghouse No. 308 motors, having a normal rated capacity of 225 hp. each. It was required that the weight of the trailers should be such that the operation of one trailer car with three motor cars would be well within the capacity of the motors in express service. At the same time it was necessary to adhere to the general dimensions of the motor car as to height, length and width because of station platform requirements and to preserve the uniform general appearance of the train. The strength of the underframe and body was required to be at least equivalent to the strength of the motor cars with which they are to operate. Owing to the fact that additional equipment was needed for summer service only, it was feasible to reduce the weight and cost by the omission of the false floor, inside lining and provision for heating, and a car has been built which has a seating capacity of 80 with a total of 63,000 lb., a weight of only 787½ lb. per seated passenger; a class MP-54 motor car weighs approximately 110,000 lb. and seats 71 passengers, the weight per seated passenger being about 1,550 lb.

The cars are 64 ft. 5¼ in. long from face to face of couplers. The over-all width is 9 ft. 10¾ in., and the omission of inside lining and insulation has made possible an inside width of 9 ft. 9⅝ in. between posts with a clear width at the posts of 9 ft. 4½ in. An unusually wide aisle has thus been provided. The trucks

Long Island Steel Trailer

are placed 39 ft. 9 in. between centers and the car has a total wheel base of 46 ft. 1 in. The height from the rail to the top of the roof is 13 ft., the ventilators adding 8¼ in. to the clear height.

UNDERFRAME

The principal member of the underframe is the box girder center sill which is the same as that used on the class MP-54 motor cars. It consists of two 9-in., 15-lb. channels of 61 ft. 4½ in. long with top and bottom cover plates respectively ¼ in. and ⅜ in. in thickness. Cast steel draft sills which take the Westinghouse friction draft gear, are secured to the bottom of the center sills. Cantilevers extending from the center sill to the side sills of the car are placed 13 ft. 3 in. on either side of the transverse center line. Owing to the light weight of the body of the car, cast steel spiders have been used instead of the usual pressed steel construction, the webs being cored out to reduce the weight. The ends of the center sill are framed and riveted to the middle castings of the platform end sills, the length over which is 63 ft. 4¾ in.

The side sills are 5 in. by 3½ in. by ⅞ in. angles placed with the horizontal flanges up in order that they may be used as a direct floor support. They are secured to the ends of the cantilevers and to the body end sills. Additional crossties are provided near the truck centers and at points 4 ft. 3 in. on either side of the transverse center line of the car. These are of channel section placed flanges down and the ends are riveted to the horizontal flanges of the side sills and to the lateral projection of the top center sill cover plate.

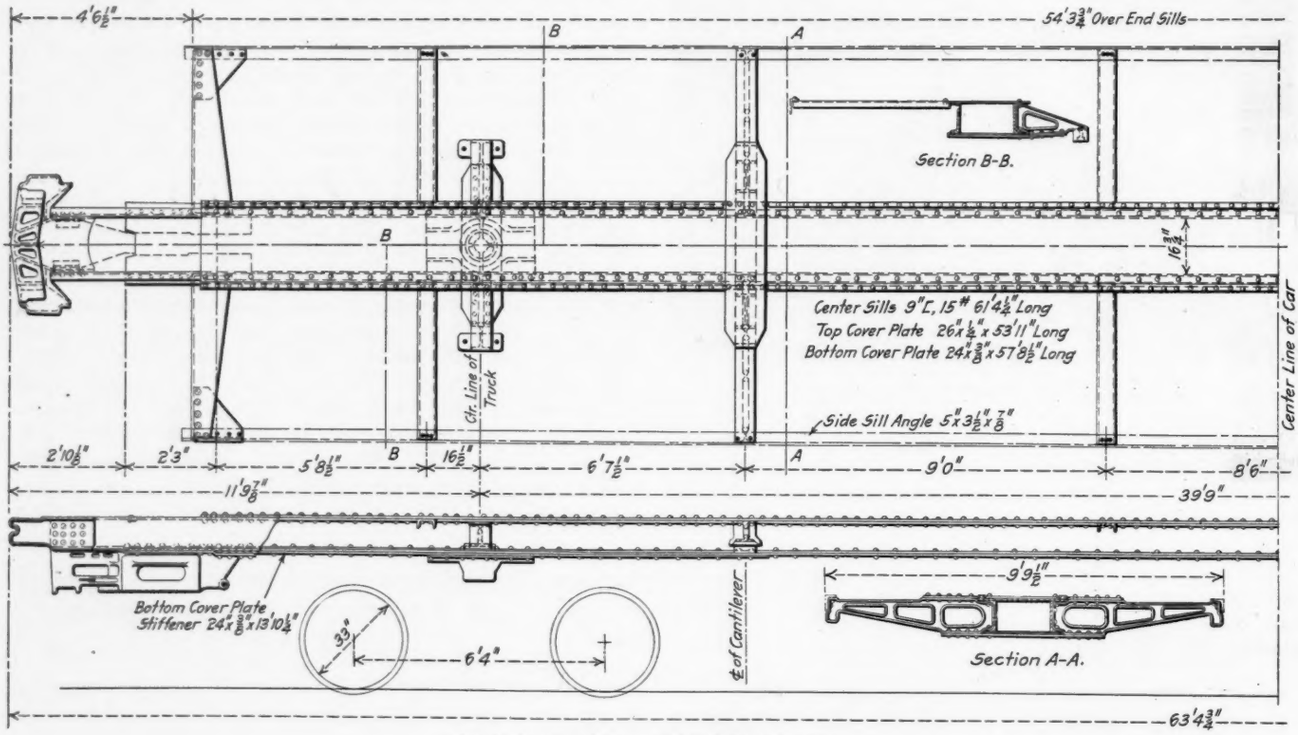
The body end sills are of pressed steel placed with the webs out, the ends of the web members being bent at right angles to the body of the sill and bearing against the vertical faces of the side and end sills. The top flanges are tapering, the wide ends providing ample strength and riveting area at the center sills. At the outer ends gusset plates are used to furnish suitable connections to the side sills.

The trucks are provided with inside side bearings and the body side bearings are supported by cast steel struts riveted to the center sills and reinforced on the lower flanges by a transverse cover plate.

END CONSTRUCTION

In order to provide ample strength to resist the tendency to telescope in collision, 12-in., 31½-lb. I-beams were used for the vestibule end posts. These are placed between the middle and outer end castings into which they are framed and riveted to the total depth of the casting. The vestibule corner posts are pressed steel, ¼ in. thick and are of a special U-section with one leg longer than the other. They extend from the bottom of the platform end sills to the I-beam posts at the roof and serve as a riveting member for the vestibule end sheet and the roof sheet. The vestibule end posts are tied together by a pressed steel diaphragm which serves as a header for the vestibule end door and an additional tie is provided by the roof sheets.

The body end construction is made up of three truss members; two door posts of pressed steel box section and the combined body corner posts and car lines which extend from body end sill to body end sill. In common with the combined posts and carlines of the side frame construction this is made in two pieces to facilitate manufacture and welded on the center line of the car, thus forming a continuous member. The door posts have the cover plate members extending the full depth of the end sill to which they are riveted, the U-shaped members being flanged and riveted to the top of the sill. The door header is of the same section as the posts and ties them securely together. They are further tied at the roof by the combined carline posts.

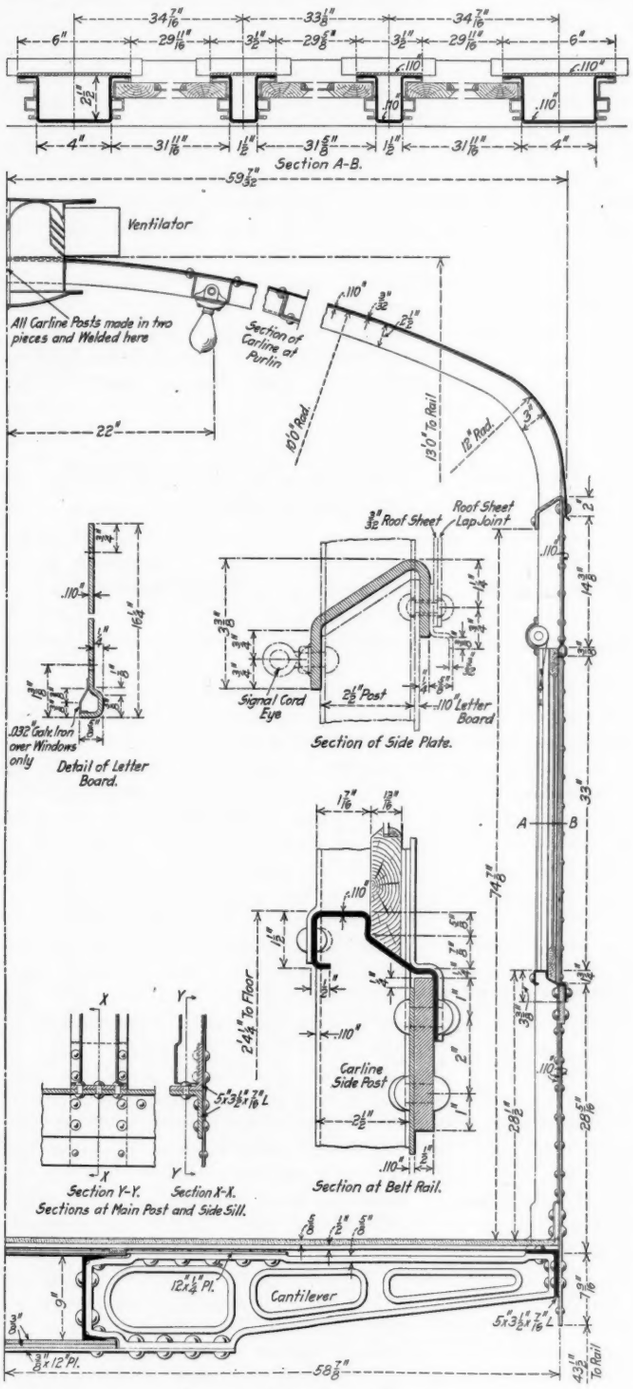


Underframe of Long Island Trailer Car

BODY FRAMING

In order to reduce the weight and cost of construction the arch roof was decided upon. The posts and carlines are combined into single continuous members of U-section with the flanges turned outward for riveting to the side and roof sheets, an arrangement which gives a pleasing appearance to the interior of the car. Owing to the shape of the roof and the fact that but 3/32 in. sheets were to be used the carline construction was inadequate to support the sheets. Continuous pressed steel purlines were therefore placed 21½ in. on either side of the center line. These extend throughout the length of the body from door post to door post. Where they cross the carlines they are

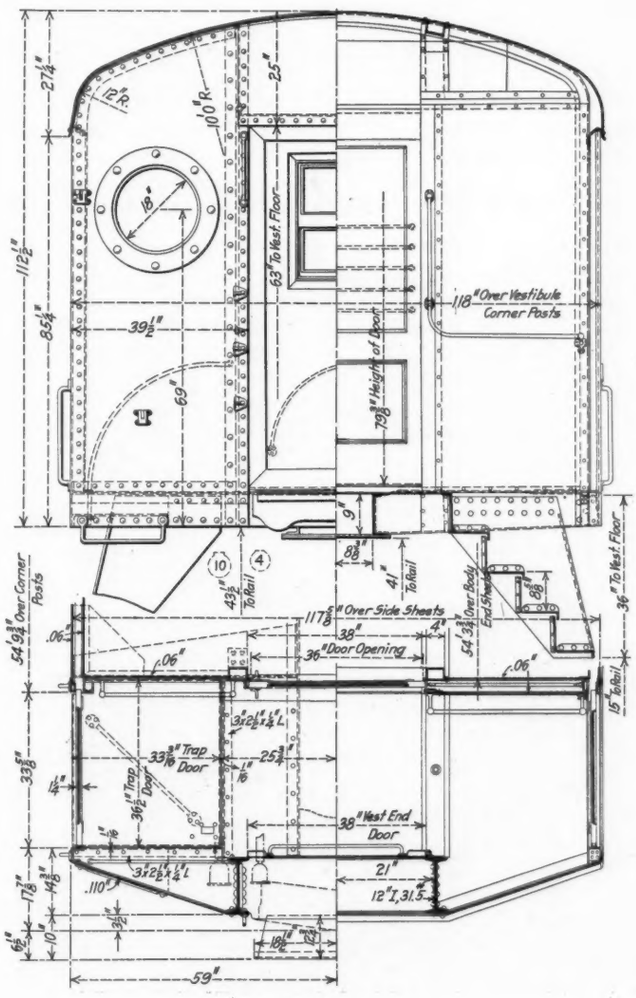
pressed to the contour of the latter with the flanged portion of the section bearing against the leg of the carline and riveted to its bottom face. This construction not only gives strength to the roof and adds considerably to the longitudinal rigidity of the superstructure, but produces the effect of a beamed ceiling and adds to the pleasing appearance of the interior. These pur-



Details of the Body Framing

lines are utilized to carry the conduits for the electric light wiring, the lamp sockets being secured directly to their lower faces. In order to provide the maximum amount of longitudinal stiffness and to impart additional strength to the vestibule end posts and reduce their tendency to deflect at the roof under collision impact, the same spacing was used for the vestibule end posts, the body door posts and the carlines, thus bringing them all in line. Vestibule purlines of the same section as those used in the interior of the car are placed between the vestibule end posts and the body end posts, and the vestibule is further stiffened longitudinally by increasing the thickness of the roof sheets from 3/32 in. to ⅛ in.

The length of the body is 54 ft. 9¾ in. over the corner posts, and each side frame is divided into five side and two corner panels, the former being 8 ft. 6 in. long from center to center of carline posts, and the latter 5 ft. 10⅞ in. from the center line of the carline posts to the inside of the body corner posts. Each of the side panels contains three windows, which are separated by vertical members of U-section extending from the side plate to the belt rail. The corner panels each contain one window, framed by the carline post on one side and on the other by a U-section post extending from the side sill to the plate. A pressed steel window sill is attached to the carline posts and forms the bottom attachment for the vertical members between the windows. It is flanged over the top of the belt rail and



Vestibule Construction

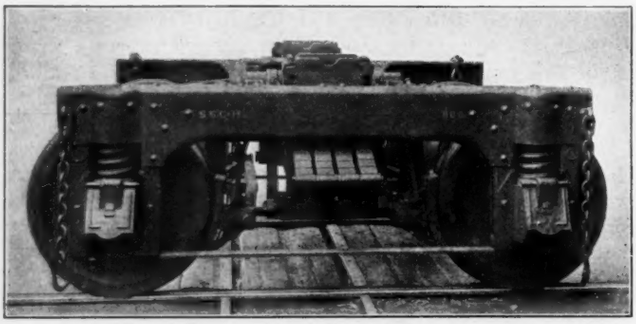
is riveted through to the side of the car. The belt rail is of rectangular section ½ in. thick by 4 in. wide and extends from body corner post to body corner post. The side plate is a special pressed steel U-section extending throughout the length of the car body. The web and outside flange are cut away at the side posts and the inside flange is riveted to the posts. The outside flange extends over the top of the letter board and is riveted between this and the lower edge of the roof sheets.

All framed members have been formed to produce a finished appearance on the interior of the car, and no interior finish has been used with the exception of the pressed steel molding

which covers the curtain rollers just above the tops of the windows.

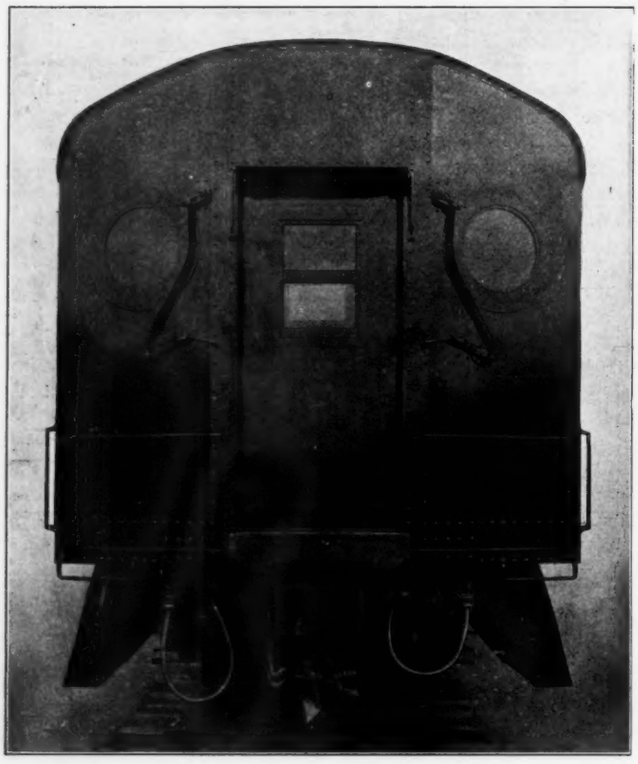
TRUCKS

The cars are equipped with four-wheel trucks having a wheel base of 6 ft. 4 in. These trucks are of an unusually simple design and weigh 9,400 lb. each, complete. The general features of



Four-Wheel Truck for the Long Island Steel Trailers

the construction are clearly shown in the illustrations. The side frames and transoms are of pressed steel, while the bolster and spring plank are steel castings. By widening the flanges of the transoms at the ends and providing corresponding lateral extensions from the top side frame flanges a very rigid transom and



End View of the Long Island Trailer

side frame connection has been secured and end rails are dispensed with. Steel pedestal castings provided with coil spring pockets are riveted to the ends of the side frames, which are specially formed to receive them. The truck is equipped with a light cast steel spring plank, which is suspended by swing links pivoted on the top of the cross frame. Both the bolster guides and the pedestals are fitted with wearing plates, which may be easily removed and replaced. The trucks are equipped with rolled steel wheels 33 in. in diameter, which are mounted on axles with 4¼ in. by 8 in. journals. Ajax metal bearings are used.

FINISH

The floor is finished with the railroad's standard top coated monolith laid in Ferro-inclave sheets. No false floor is provided.

The exterior of the car is painted Tuscan red to conform to the Long Island's standard for passenger equipment. The interior is finished in white and light olive green, white enamel being used above the side plates and the olive green from the side plates to the floor. The seats are rattan covered and have no arms. They were furnished by Heywood Brothers & Wakefield Company, and are low enough to make possible the elimination of foot rests. The cars are ventilated by five automatic ventilators set into the roof on the centerline of the car.

Since the cars are trailers no provision has been made in the vestibule for train control. The cars are provided with bus and control lines, however, for attachment to adjoining cars when operated in multiple unit trains. Current for lighting the cars is taken from the bus line. In making up trains where detachable jumpers are used considerable delay is often caused by the failure to find the proper jumpers at hand. In order to overcome this difficulty the jumpers are integral parts of the wiring of these cars and dummy receptacles are provided for holding the jumper head when not in use. This feature is shown in the illustration of the end of the car.

QUALIFICATIONS OF PUBLIC SERVICE COMMISSIONERS

Experience in connection with public utilities should be made a necessary qualification for public service commissioners. This fundamental truth is the subject of a strong letter which has been sent by a committee of engineers representing the national and local engineering societies to the committee on public utilities of the New York State constitutional convention, now sitting at Albany. Men familiar with the technical, financial, commercial and legal matters, which come before a public service commission, are, of course, best fitted to render valuable service to the public, and the committee declares that there are to be found among those connected with public utility companies men with as broad conceptions of public rights and of the duties to be fulfilled to the public as can be found in other walks of life.

The engineers also urge on the constitution makers that the point of greatest importance in any plan for an organization of the public-utility commissions of the States is the preservation of the principle of continuity already established, in the present Public Service Commissions of the State, whereby the term of office of the members of the commission expire at different times, so that only one member of the commission at a time goes out of office.

Represented on the committee of engineers presenting this letter are the American Society of Civil Engineers, the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the American Institute of Consulting Engineers, the New York Section of the American Institute of Mining Engineers, the Municipal Engineers of the City of New York and the Brooklyn Engineers' Club. The letter, prepared by a sub-committee consisting of Charles Whiting Baker, Gano Dunn and W. W. Brush, says, further:

"If a change were to be made in the public service law so that an entirely new commission would be appointed by each new governor, there would be danger not only that the commissioners would be appointees without the experience and knowledge necessary to formulate and carry on a sound constructive policy, but that the principal employees of the commission would be changed for political or personal reasons with the coming in of each new commission.

"The constitutional requirement we have suggested—previous experience in connection with public utilities as a requisite to a commissioner's appointment—is not to be construed as a rigid limitation upon the governor's discretion in making appointments. The responsibility would properly be upon the governor to judge as to how much experience was requisite to fit a candi-

date for appointment. The value of such requirements, embodied in a statute or a constitution, is that they define the requirement which the governor should have in mind in the selection of candidates. It is not pretended that this requirement or any other which could be framed could prevent the selection of unfit candidates. It is believed that such clauses are of value, nevertheless, in setting up a standard to which most men in the long run will seek to conform.

"There should be one public service commission for the whole State instead of two as at present, it being understood that under such a proposed reorganization the work of constructing and administering the New York City rapid transit system would be transferred to the city, which now owns the system, and would cease to be a State function. New York is the only State which has two separate public service commissions. The reason why New York has two commissions has to do with conditions which existed a quarter-century ago and which do not exist at the present day. By having a single commission for the entire State certain difficult questions as to division of responsibility between the commissions are set permanently at rest."

The committee proposes that each commissioner shall hold office for ten years and that removal by the governor should be made only after the filing of charges and after affording the accused an opportunity to be heard in the matter, provided, however, that at any time within the first six months after making an appointment the governor may exercise the power of summary removal * * *.

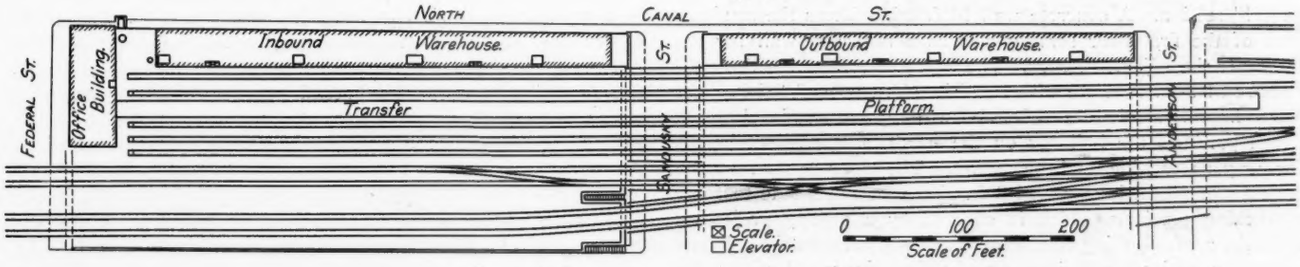
NEW PITTSBURGH NORTH SIDE FREIGHT STATION OF THE P. R. R.

BY HARTLEY M. PHELPS

The Pennsylvania Railroad has recently completed a new freight station with inbound, outbound and transfer facilities near the center of the manufacturing district on the north side of the city of Pittsburgh. This station will replace the old Anderson street house, and the transfer station at Ross, 7.8 miles east on the Conemaugh division, and eventually the business now handled at the North avenue house, a few blocks distant from the new station, may be transferred to this point. The Anderson street house, which was erected more than forty years ago, had become inadequate for the business which it handled, making the provision of better facilities imperative. An indication of the improvement is the increase in floor space from 8,415 sq. ft. in the old building, to 64,850 sq. ft. in the new. The North avenue house on the Pittsburgh, Fort Wayne & Chicago (Pennsylvania Lines West), built about ten years ago, is still in good condition and has ample capacity to take care of the business in the zone of which it is the center. The shorter distance from the heart of the less-than-car-load freight center of that part of the city to the new station will, however, undoubtedly deflect a considerable portion of the business now going to North avenue to the new location. The new house is located between Federal street, the chief retail business street of the north side, and Anderson street. Sandusky street, intermediate between these two, is carried under the building on the first story level. The entire project, including the construction of the transfer platform and office building, has cost more than $500,000.

As an indication of the traffic that will be handled at the new station, the Ross Transfer, Anderson street station and North avenue station have handled on an average during the last five years, 3,616 tons of C. L. freight, 348 tons of L. C. L. freight and 456 tons of transfer business daily. No C. L. or L. C. L. business is received or delivered at Ross Transfer, this being exclusively a transfer point. The average tonnage of 219 tons per day handled here consisted of (1) freight moving from points west of Pittsburgh to points on the Conemaugh division or vice versa, (2) Pittsburgh and Monongahela division cars moving to or from the Conemaugh division, (3) shipments to or from points not on the Conemaugh division routed via Black Lick and the Cresson division and (4) shipments on the Conemaugh division from points west to points east of Freeport and vice versa. At the Anderson street station C. L. and L. C. L. business was forwarded to all points. This station also received C. L. freight from all points and L. C. L. freight from points east of Pittsburgh. No transfer work was done here. The average tonnage at this station for the period named was, C. L. freight received, 1,098 tons, forwarded 387 tons, and L. C. L. freight received, 75 tons, and forwarded, 108 tons. At the North avenue station, L. C. L. business is forwarded to all points on the Pennsylvania system, but received only from the Lines West. Shipments are accepted from the lines east only when specifically consigned to this station. Car load shipments are received from and forwarded to all points on the Pennsylvania system.

New North Side Freight Station at Pittsburgh



Plan of Pennsylvania Freight House and Tracks at Pittsburgh

Transfer freight is received from all points west for the east, but very little freight from the east is accepted for the west. The average daily tonnages at this station are as follows: C. L. received, 1,729 tons; forwarded, 400; L. C. L. received, 75 tons; forwarded, 90, and transfer tonnage, 240. A combination of the business of these three stations in the new station at Federal street will eliminate some movements between the stations, some rehandling and the duplication of engines for shifting, station force, etc. In addition, the freight will be handled with greater despatch, therefore better serving the interests of the shippers.

The new structure really consists of four parts, a 3-story office building 41 ft. wide and 110 ft. long facing on Federal street and extending across the end of the inbound house, the transfer platform and the five station tracks; a two-story inbound house 450 ft. long and varying in width from 31 ft. 4 in. to 37 ft.; an outbound house 383 ft. 5 in. long and varying in width from 25 ft. 5 in. to 30 ft. 6 in.; and a transfer platform 1,000 ft. long and 15 ft. 3 in. wide. Provision is made in the design for the addition of a fourth story on the office building and third

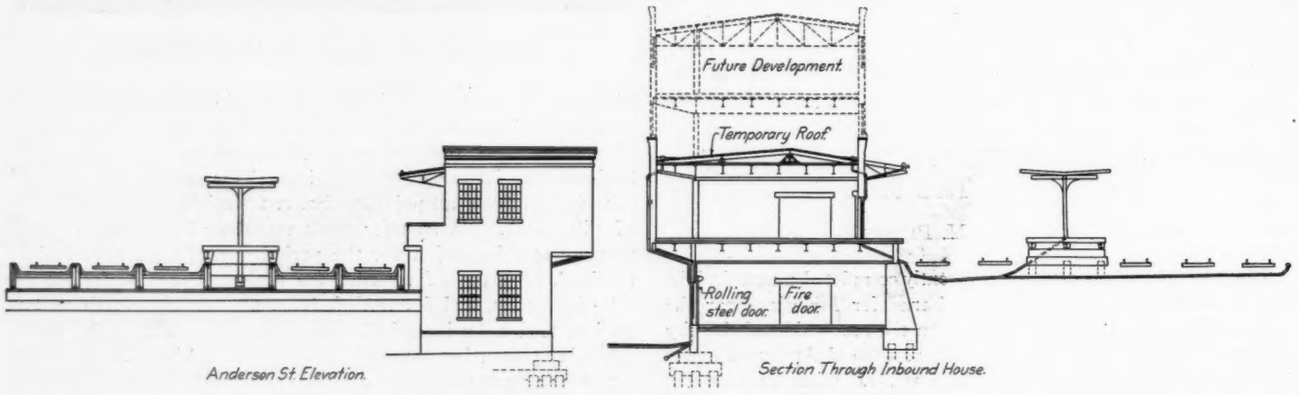
and fourth stories on the inbound house if desired. The second story of the houses is carried continuously across Sandusky street, the 60 ft. width over the street being occupied by an office. The width of the building on this floor is 8 ft. greater than the dimensions given above on account of the overhang on the street side, which, in addition to increasing the floor area, provides a shelter for teams loading or unloading at the street doors.

All tracks are elevated over the streets, the grades being such that the second story of the freight house is level with the floors of cars. The subways are of the half-through steel girder type with solid deck on concrete abutments. The surfaces of the abutments are finished with a mixture of marble dust and mortar placed monolithic with the concrete. The appearance of stone work is given to these walls by the impression of strips nailed to the forms which resemble mortar joints. Light steel frames were suspended from the deck of the bridges to which were fastened steel laths plastered with marble dust mortar.

The building is of brick, steel and concrete construction with concrete footings on 16-in. concrete piles extending down through a 15-ft. stratum of filled material. The columns along the north side of the building are spaced 18 ft. center to center and in common with the other columns throughout the building are of an "H" section. A concrete wall 13 ft. high forms the southern wall of the first floor serving also as a retaining wall for the fill under the adjacent tracks. The floors of the station throughout are of 5-in. concrete with a 1½-in. "Truss Con" finish. The lower floor is about 3 ft. 9 in. above the grade of Canal street, which parallels the building on the north, a convenient height for wagons loading and unloading. The floor system at the second story level is extended 8 ft. along the south side to form a trucking platform which is covered by a canopy projecting from the roof. Rolling steel doors are hung between the columns along the entire street base on the first floor and along the entire railroad base on the second floor. Transverse fire walls and fire doors are provided throughout the building; steel window sash of the Fenestra type are used, and the construction is made fire-resisting in every detail. The building is equipped with automatic platform scales, six Otis electric elevators of four tons capacity and two of six tons capacity. Spiral steel stairways connect the warehouse floors. The office building portion is faced with glazed tile, and all window frames are of copper. The ground floor of this portion of the building will be rented for stores and the upper two stories occupied by offices of the Conemaugh division. The warehouse buildings are faced with buff Kittaning brick and have a slightly gabled roof of 3-in. reinforced concrete slabs covered with asphalt paper and pitch and finished with a terra cotta coping.

The transfer platform is of reinforced concrete construction with a "Truss-Con" finish. It is covered by a shelter supported on a single line of steel columns along the middle of the platform. Five station tracks are provided, two between the building and the transfer platform and three between this platform and the first main track. A small team yard with stone block pavement is provided at the east end of the station and is equipped with a 30-ton electric crane for handling heavy freight.

The construction of this building was handled under the supervision of Andrew Keiser, superintendent of the Conemaugh division, and R. L. O'Donnel, general superintendent of the Western Pennsylvania division. The plans were prepared under the general supervision of W. G. Coughlin, engineer maintenance of way.

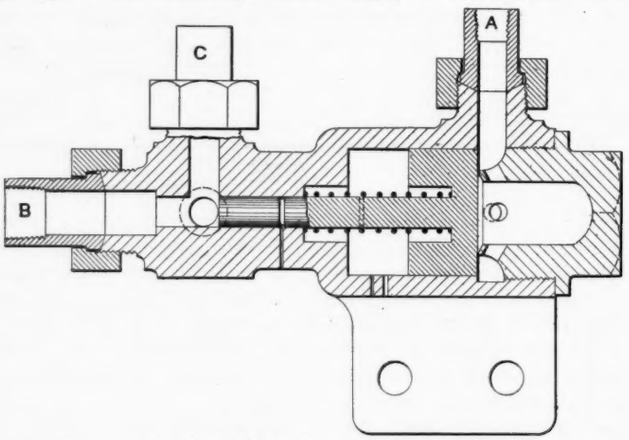


Sections Showing Relation of Tracks to Houses

AUTOMATIC DRIFTING VALVE

An automatic drifting valve for use on superheater locomotives is shown in the drawing. Its operation is controlled by the pressure in the live steam passage of the valve chamber.

The body of the valve has four pipe connections: Pipe *A* leads to the live steam passage of one of the valve chambers or to one of the steam pipes; pipe *B* to the turret, or other source of constant boiler pressure, and the two pipes *C* to the live steam passages of the valve chambers. When the throttle is open the plug piston in the large chamber at the end of the valve body is subjected to the pressure in the valve chamber. The resulting movement of the piston to the left closes communication between the constant steam supply at connection *B* and the passages leading to the valve chambers. On the release of pressure at *A*, due to the closing of the throttle the spring forces the piston back to the right, opening the communication between connection *B* and passages *C* and admitting a limited supply of steam to the valve chambers, which provides a medium for carrying and distributing the lubricant over the valve chamber and cylinder walls.



Automatic Drifting Valve for Superheater Locomotives

The device is known as Wood's vacuum breaker. A patent has been applied for and it is being manufactured by the Nathan Manufacturing Company, New York. On service trials its performance is understood to have been highly satisfactory. It may be located at any convenient point on the locomotive, preferably near one of the cylinders.

ELECTRIC LOCOMOTIVES

At the meeting of the Chicago Section of the American Society of Mechanical Engineers, May 14, the subject of electric locomotives was discussed by A. H. Armstrong and A. F. Batchelder, of the General Electric Company, Schenectady, N. Y. Mr. Batchelder gave an illustrated talk in which he briefly described the various mechanical features of electric locomotives. He was followed by Mr. Armstrong who spoke on the performance of these locomotives.

Mr. Armstrong called particular attention to the rating of electric locomotives, stating that the time element is a most important factor in its determination. The motors when operated continuously deteriorate when heated above a certain temperature, although it takes considerable time to reach a dangerous point. It is therefore necessary to know the rating of the electric locomotives, in addition to their starting tractive effort, for short periods of say one hour's performance in addition to the continuous performance. It is important that this be clearly understood at this time when long distances of steam railroads are being electrified. In acknowledging the improvements that have been made in the steam locomotives, it being now possible to get a horsepower with about 15 lb. of steam, Mr. Armstrong claimed that the electric locomotive, notwithstanding these improvements, offered many claims for consideration.

In considering high speed passenger service he called attention to the latest type of New York Central electric locomotive, which will handle a 1,200-ton train at a speed of 60 miles an hour, giving an output continuously without danger from overheating of 2,000 hp.; 2,600 hp. can be obtained for one hour. This engine is able to handle the service of overland trains for any distance at a speed of 60 miles an hour or more.

Referring to electric locomotives for freight service, he called atttention to the installation on the Butte, Anaconda & Pacific. This was made for the sole purpose of obtaining more economical operation. The preliminary report indicated that the money saved by putting in the installation would pay 18½ per cent on the capital required to make the change from steam to electric operation. For the first six months the results obtained indicated a yearly return on the capital invested of 20 per cent. This road operates heavy freight trains which average from 3,500 to 4,000 tons, and 4,500 tons is not unusual. Each locomotive unit weighs 80 tons, two units being used to handle the heavy trains on the 0.3 per cent grade. The locomotives have a tractive effort of 26,000 lb. at a speed of 16½ miles per hour continuously. This corresponds to a factor of adhesion of about 6. From investigation Mr. Armstrong stated that it is found to be almost universal practice to give a locomotive a rating calling for a tractive effort on the ruling grade of about 18 or 19 per cent co-efficient of adhesion, and that the electric locomotive was designed to follow this practice very closely, although advantage is taken in the electric locomotive to obtain a greater output for a short time than it can sustain continuously. In heavy trunk line work the difference between the short period rating and the continuous rating is small.

Speaking of the new installation on the Chicago, Milwaukee & St. Paul, Mr. Armstrong explained that this system is a 3,000 volt direct current system, practically the same as used on the Butte, Anaconda & Pacific. The weight of each locomotive unit is 110 tons on drivers and where two are used, as will be the general custom, the total weight will be 270 tons. A continuous 24-hour rating of 3,200 hp. is obtained with these engines and a tractive effort of 72,000 lb. at a speed of 15¾ miles an hour. Mr. Armstrong claimed an increase of 10 per cent in tractive effort for the electric locomotives with the same weight on drivers over that which can be obtained in a steam locomotive on account of the reciprocating and imperfect rotary motion of the steam locomotives.

Over the Belt Mountains where there is an average grade of .71 per cent for 49 miles, one of these 270-ton locomotives will haul 2,500 tons at a speed of approximately 16 miles an hour. The locomotives for both passenger and freight service are identically the same with the exception that those used in freight service are geared to a ratio of 4½ to 1, while those in passenger service are about 2½ to 1. This is standardization to the highest degree and permits of the minimum number of repair parts. As stated before, electric locomotives are made in two sections, being connected together with an articulated joint for the purpose of permitting the operation of each half singly. This will be of special value in light local passenger trains or for shifting work.

The Chicago, Milwaukee & St. Paul electric locomotives introduce for the first time direct current electric braking of the regenerative type. In other words, the motors are reversible. Going up the grades they receive electrical power, and in going down the grades the train will drive the motors as generators and thus brake the train or hold it electrically and return power to the line. In ascending grades these engines consume from 4,500 to 5.000 kw., and the efficiency of a locomotive under these conditions is about 88 to 89 per cent without considering the losses of the blowers, air compressors and fans and incidental parts of the locomotive itself. In Mr. Armstrong's opinion the benefit of this electric braking on the mountain grades will be not so much in the power returned to the line as the economy introduced thereby in the elimination of derailments due to broken shoes and overheated wheels on the the long down grades.

Referring back to the latter type of New York Central locomotives, Mr. Armstrong stated that there are no bearings on the motors of those locomotives, thus eliminating mechanical friction. This permits of an efficiency as high as 93 to 94 per cent; that is, of the electrical power input to the locomotive between 93 and 94 per cent is returned as mechanical output at the rim of the drivers. The Milwaukee locomotives, on the other hand, will give an efficiency of not much higher than 84 or 85 per cent operating on level track. The profile of the Milwaukee road was such as to preclude the use of the gearless type used on the New York Central.

The Milwaukee electric locomotives have a tractive effort of 72,000 lb. per unit and a starting tractive effort of 120,000 lb. or when run double-headed, a starting tractive effort of 240,000 lb. With the 3,000 d. c. line voltage there will be 1,500 volts on each motor. The electrified portion of the Milwaukee road is 440 miles long, and there will be 14 substations at approximately an average distance of 30 miles apart on the entire road.

WOMEN RAILWAY WORKERS IN GERMANY.—It has been reported from Berne that the Prussian and Hessian State Railways are employing a number of women as line keepers (Streckenarbeiter), although this is very heavy work. All women, before being engaged, are obliged to sign an agreement that they will have nothing to do with Social Democracy or with the Transport Workers' Association, that they will never attend Social Democratic meetings, or be in any way associated with the Social Democratic propaganda or efforts.

RAILWAYS IN ASIA MINOR.—The Turkish Ministry of War is reported to have been granted a large credit to build and operate four main and two branch lines, all under military control. The chief of these lines are from Angora to Erzerum, from Erzerum to a point on the Black sea, from Murally to Rodosto, and from a point on the Erzerum Railway to the Black sea.

BETTER FACILITIES ON PHILIPPINE TRAINS.—The Board of Public Utilities Commissioners has handed down a decision ordering the Philippine Railway, on its Cebu lines, to install better lights in its second- and third-class coaches and to supply to all passengers individual drinking cups at a nominal cost. The company is also forbidden to permit more passengers than there are seats to ride in the coaches.

General News Department

About 150 machinists, boilermakers and sheet metal workers employed by the Kansas City Terminal Railway went on strike last week on account of a controversy with the company regarding the scale of wages and the employment of non-union labor.

The Chicago railroads were prominent in the lists of contributors to the fund for the relief of families who lost members in the Eastland steamboat disaster of July 24. The large roads gave $2,000 each and smaller roads lesser amounts. The Traffic Club of Chicago gave $500.

The Veterans' Association of the Baltimore & Ohio will hold its first annual outing at Berkeley Springs, W. Va., August 12. Z. T. Brantner, president of the association and a veteran of fifty years' service, who is superintendent of shops at Martinsburg, W. Va., has charge of the celebration, for the Cumberland division veterans, who will be the hosts. This association has social and fraternal features, the membership including men of every grade of employment and from all branches of the railroad.

On the night of July 25 the ticket collector on a train of the St. Louis, Iron Mountain & Southern was robbed of $20, in full view of the passengers; and the robbers, two of them, not masked, then stopped the train and leaped off in the darkness. The train was No. 105, eastbound, and the robbery occurred at Fort Gibson, Okla., about midnight. In the panic attending the appearance of the robbers, the trainmen put out the lights in the coaches, and the darkness is believed to have prevented further activities on the part of the robbers.

The safety bureau of the Union Pacific reports that during the year ending June 30, 1915, the road carried 4,550,949 passengers without a fatality to a passenger. Less than half as many employees of the road were killed during the year as in the fiscal year ending June 30, 1913, which was the last year before the bureau of safety was organized. In 1915 28 employees were killed, as compared with 59 in 1913. In 1915 4,537 employees were injured and in 1913 6,097 were injured. In 1915 229 passengers were injured, and in 1913 333 passengers were injured.

At Yaphank, Long Island, on July 21, a westbound express train of the Long Island Railroad, running about a mile a minute, struck a wagonload of gravel, drawn by a steam tractor, the driver of which was following the somewhat prevalent Long Island fashion of risking his life and his employer's property at a grade crossing by driving over the tracks when it was known that a train was approaching. The crossing has an automatic bell, which was ringing at the time of this narrow escape. The tractor and its two trailers made up a heavy gravel train, weighing 15 or 20 tons, and, says Mr. McCrea, general manager of the road, in reporting the accident, might easily have made a fatal obstruction on the track. Had the train come along 20 seconds earlier, it would have struck the tractor itself, or the middle wagon. Mr. McCrea has complained to the Public Service Commission of the state, calling for relief; but that body replies that it has no authority over traffic on the highway. In this case the tractor was being run by a negro who had no license. It was owned by Frank Arrigoni & Brother, who were hauling gravel for road-building purposes.

The Department of Agriculture announces that Stuben County, New York, has been placed under quarantine on account of the discovery of foot and mouth disease in a herd of cattle near Hornell in that county. The counties of Onondaga, Oswego and Rensselaer and the stock yards at West Albany, as well as large areas in other States, have been released from quarantine. The entire State of Kentucky is now freed from quarantine, except that in the Bourbon Stock Yards at Louisville the management has arranged to limit the handling of animals intended for feeding, stocking and dairy purposes to the new sheep and cattle division, in which no infection has existed. The same order frees the State of Wisconsin entirely, and reduces the quarantined area in Illinois, New Jersey and Pennsylvania. The status of Maryland, Massachusetts, Michigan and Virginia remains unchanged. An order effective August 2 reduces that portion of Hudson County, New Jersey, quarantined against the foot and mouth disease to an area lying within a three-mile radius of infected premises at Secaucus, near New York City. Allegheny County, Pennsylvania, is released from quarantine with the exception of the Pittsburgh Union Stock Yards at Pittsburgh. Philadelphia County is released with the exception that the West Philadelphia Stock Yards, and that portion of the county lying south of Washington Avenue, Philadelphia, and between the Delaware and Schuylkill Rivers remain under quarantine. The counties of Cook and Lee are the only remaining areas still under quarantine in Illinois.

The Gollos Automatic Stop

The operation of the Gollos automatic train control was demonstrated on the Chicago, Burlington & Quincy, between Sugar Grove, Ill., and Big Rock, on August 3 and 4. A special train carrying officers of the company and a number of representatives of the signal and operating departments of central and western roads left Aurora at 12:30 p.m. each day, returning about 4:30 p.m. The installation over which the demonstration run was made is 6 mi. long and includes 8 ramp locations for westbound movements and 10 for eastbound, on a single-track line.

The system is of the intermittent contact rail type, with the engine apparatus inoperative while running between points of indications. When the engine shoe makes contact with an energized contact rail the engine apparatus is still held inoperative. When a train is standing, the apparatus is in such a condition that the train can proceed only at a predetermined reduced speed. When the engineman opens the throttle, a whistle in the cab is automatically started, which continues to sound until the engine shoe engages a clear contact rail. This rail being fully energized, supplies the current which actuates the control in the cab to permit the train to proceed at full speed, and also stops the whistle. The contact with this shoe is recorded by an automatic apparatus, and the contact also causes the lighting of a signal lamp in the cab. The passage of this rail is acknowledged by the engineman by pressing a button which puts out the lamp and records the fact on the automatic recorder. This is the usual procedure in passing a clear contact rail.

When the contact shoe engages a partially energized contact rail, indicating caution, the engine apparatus is again set for reduced speed and the whistle blows continuously. If, while passing through a block at caution speed, the train in the advance block has moved on, so that the next contact rail is in the clear condition, the cab system will be automatically turned to normal full-speed condition; but if the dangerous condition continues, the contact rail is de-energized and the train will be automatically stopped when the contact shoe strikes the de-energized rail. This stop is also recorded and a chime of two whistles is sounded to warn the engineman of the stop application. If the engineman desires to proceed he unlocks and opens a cabinet box which encloses the instruments and resets the automatic apparatus to caution or slow speed condition. Both the opening and closing of this cabinet and the resetting of the instruments are recorded automatically. He may now proceed at controlled reduced speed until he strikes a clear ramp.

If the engineman has observed a stop signal and stops his train before the engine shoe comes in contact with the de-energized rail, he may pass to the energized rail by holding down continuously a separate button until the rail is passed. The pressing of this button is also recorded and if he should attempt to pass a rail by pressing this button before the train has stopped, a stop application would result.

The functions of the system include automatic speed control

and an automatic train stop; a visible signal to indicate entrance to block section, an audible signal sounded continuously in a caution block; an audible signal sounded continuously in "danger" territory as distinguished from the audible caution signal; and an automatic record of the time a block is entered, the time of acceptance of signals by enginemen; automatic application of brakes when the engine passes a signal indicating stop; the opening of the cabinet to release train brakes; release of train brakes after automatic application, closing and automatic locking of cabinet to again secure integrity of the apparatus and non-interference, and permissible emergency passing of a signal at stop.

The system, which is controlled by the Gollos Railway Signal Supply Company of America, Chicago, was turned over to the Interstate Commerce Commission for tests on July 26.

Summary of Revenues and Expenses of Steam Roads

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for May, 1915, are as follows:

Net operating income of the railways of the United States for May increased $63 per mile, or 31.9 per cent., as compared with May, 1914. This increase was due in the main to reductions in expenses, which have been effected in all parts of the country. In May, 1914, net operating income per mile was 27.9 per cent. less than in May, 1913.

Total operating revenues amounted to $237,976,843, an increase from 1914 of $380,044. Operating expenses were $167,600,891, a decrease of $13,787,085. Net operating revenue amounted to $70,375,952, an increase of $14,167,129. Taxes amounted to $11,343,308, a decrease of $557,253. This left $58,976,635 for net operating income, available for rentals, interest on bonds, appropriations for improvements and new construction, and dividends. Operating revenues per mile of line averaged $1,040, a decrease of 0.8 per cent. This decrease per mile is due solely to an increase in mileage, amounting during the period to about 2,000 miles. Operating expenses averaged $732, a decrease of 8.4 per cent.; net operating revenue per mile averaged $308, an incrase of 24.1 per cent., while taxes per mile were $50, a decrease of 5.6 per cent. Net operating income was $258, an increase of 31.9 per cent. Railways operating 228,818 miles of line are covered by this summary, or about 90 per cent. of the total mileage.

Total operating revenues of the eastern railways per mile of line show an increase of 2.7 per cent., as compared with May, 1914, operating expenses decreased 7.8 per cent., net operating revenue increased 40.1 per cent., taxes decreased 4.5 per cent., and operating income increased 51.6 per cent.

Total operating revenues of the southern railways per mile of line show a decrease of 6.6 per cent., operating expenses decreased 12.5 per cent., net operating revenue increased 12.1 per cent., taxes decreased 0.7 per cent., and operating income increased 14.7 per cent.

Total operating revenues of the western railways per mile of line show a decrease of 2.0 per cent., operating expenses decreased 7.2 per cent., net operating revenues increased 13.2 per cent., taxes decreased 7.7 per cent., and operating income increased 19.3 per cent.

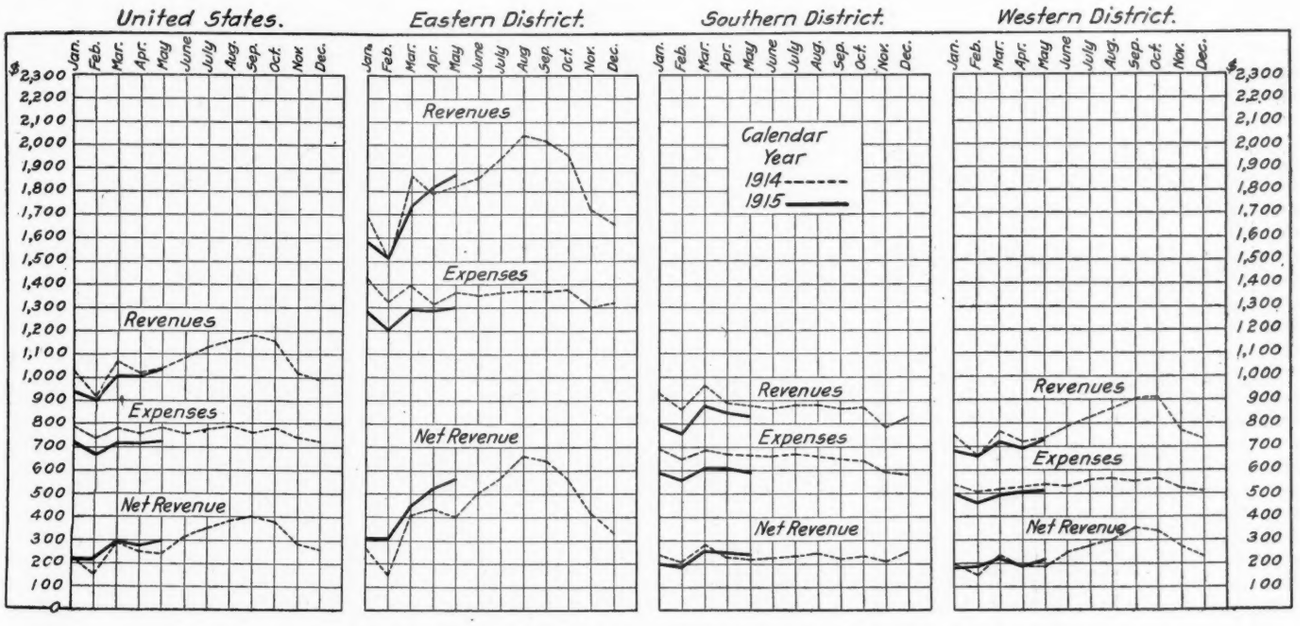
The eleven months of the current fiscal year show a decrease in total operating revenues per mile of line of 6.8 per cent., as compared with the corresponding period of the preceding year, a decrease in operating expenses per mile of 9.5 per cent., an increase in net operating revenue per mile of 0.3 per cent., a decrease in taxes per mile of 2.7 per cent., and an increase in net operating income per mile of 0.8 per cent.

The net operating income per mile increased 11.5 per cent. in the east, decreased 14.5 per cent. in the south, and decreased 2.1 per cent. in the west.

May net operating income per mile was 31.9 per cent. greater in 1915 than in 1914, 5.6 per cent. less than in 1913, 3.3 per cent. greater than in 1912, and 5.0 per cent. less than in 1911.

R. S. A. Convention Arrangements

The committee on arrangements of the Railway Signal Association has announced the completion of arrangements for a special train from Chicago to Salt Lake City for the convenience of members and guests attending the annual convention on September 14-16. The train, which will consist of a buffet-library-club car, open section compartment drawing room cars, diner and observation car, will leave Chicago over the Chicago & North Western on Saturday, September 11, at 11:55 p.m. It will arrive at Omaha, Sunday, September 12, at 1 p.m., and leave on the Union Pacific at 1:15 p.m., arriving at Ogden, Utah, on Monday, September 13, at 5 p.m., and leaving over the Oregon Short Line at 5:05 p.m., and will arrive at Salt Lake City at 6. It is suggested that those going from points west and southwest of Chicago, who are unable to join the train at Chicago, make arrangements to meet the party at Omaha, and that reservations be requested accordingly. The round trip fare from Chicago to Salt Lake City is $45, including stopovers at any intermediate points within the final limit of October 31, 1915. The rate for lower berth in standard sleeping car between Chicago and Salt Lake City, one way, is $8.50; upper berth, $6.80; compartment, $24;


United States.
Eastern District.
Southern District.
Western District.
Jan. Feb. Mar. Apr. May June July Aug. Sep. Oct. Nov. Dec.
$2,300 2,200 2,100 2,000 1,900 1,800 1,700 1,600 1,500 1,400 1,300 1,200 1,100 1,000 900 800 700 600 500 400 300 200 100
Revenues
Expenses
Net Revenue
Calendar Year
1914------
1915——

Monthly Revenues and Expenses per Mile of Line in 1914 and 1915

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1915

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.				
Alabama & Vicksburg	143	$76,812	$32,136	122,752	17,920	31,952	3,786	46,023	1,938	5,261	106,018	16,734	8,755	6,454	—14,675
Atchison, Topeka & Santa Fe	8,513	5,329,353	2,366,161	8,448,627	1,315,008	1,214,442	232,485	2,385,914	.....	186,996	5,282,540	3,166,087	403,584	2,761,137	409,173
Atlantic Coast Line	4,702	1,566,140	526,685	2,327,261	342,624	474,025	45,650	880,609	6,381	71,894	1,817,700	509,561	97,157	411,944	—61,647
Baltimore & Ohio Chicago Terminal	79	.....	2,602	137,433	17,178	14,519	870	52,660	1,716	5,010	87,785	49,649	17,654	31,936	7,364
Belt Ry. Co. of Chicago	24	.....	.....	236,258	24,988	20,839	579	96,166	.....	6,589	149,131	87,127	13,600	73,527	—36,023
Bessemer & Lake Erie	205	1,179,742	26,672	1,220,960	66,876	177,464	9,609	223,535	.....	13,155	485,942	735,018	16,781	718,228	197,073
Bingham & Garfield	27	166,422	3,132	170,875	14,852	21,226	975	21,048	82	2,202	60,385	110,490	3,848	106,642	24,695
Birmingham Southern	43	40,622	517	58,409	9,277	13,353	743	20,449	.....	3,425	47,247	11,162	2,088	9,074	—5,340
Buffalo, Rochester & Pittsburgh	586	740,348	86,744	865,746	136,958	165,660	10,859	255,718	1,398	22,824	593,418	272,329	10,000	262,328	14,720
Canadian Pacific Lines in Maine	233	52,760	15,980	75,909	18,697	13,511	4,983	31,333	.....	3,813	72,337	3,572	6,936	—3,364	41,622
Charleston & Western Carolina	341	95,298	22,171	123,937	12,855	17,408	1,359	44,635	.....	4,057	80,201	43,736	9,484	34,203	—4,862
Chicago & Alton	1,033	774,218	332,947	1,208,638	122,791	265,702	35,914	393,958	8,613	29,484	816,784	391,854	19,414	371,644	408,386
Chicago & Northwestern	8,108	4,185,757	1,874,784	6,809,610	987,302	895,613	104,602	2,375,446	53,147	149,480	4,557,713	2,251,898	391,943	1,858,876	300,654
Chicago Junction	24	.....	.....	165,303	21,998	21,207	870	89,475	.....	6,575	104,124	25,179	2,073	23,087	—18,076
Chicago, Milwaukee & St. Paul	10,071	5,281,112	1,662,543	7,810,870	868,491	1,199,647	154,958	2,469,489	67,291	184,935	4,600,293	3,210,577	387,839	2,821,835	565.459
Chicago, Peoria & St. Louis	255	83,914	21,418	113,340	25,885	23,438	5,820	51,375	.....	5,856	112,375	965	4,062	—3,097	—289
Chicago, Rock Island & Gulf	477	127,700	45,460	191,486	39,385	32,931	10,339	83,941	2,015	8,351	176,025	15,461	8,068	7,369	—37,992
Chicago, St. Paul, Minn. & Omaha	1,753	838,519	454,810	1,413,459	203,268	214,483	29,162	473,381	16,839	36,022	971,742	441,716	81,455	359,960	—2,052
Cincinnati Northern	246	104,582	16,056	127,114	23,404	32,694	2,641	42,221	.....	3,784	104,744	22,369	5,500	16,610	—1,351
Cleveland, Cincinnati, Chicago & St. L.	2,381	1,973,678	731,042	2,985,253	411,431	769,060	76,749	1,055,897	25,865	70,711	2,405,249	580,003	128,000	449,435	—49,277
Colorado Midland	338	84,139	17,981	109,679	30,212	25,813	7,526	50,039	1,225	5,501	20,315	—10,636	10,000	—20,636	—3,202
Cumberland Valley	164	181,379	54,836	248,580	38,086	24,276	4,116	75,758	870	10,389	153,495	95,085	5,794	89,291	—82,753
Delaware, Lackawanna & Western	959	2,764,787	681,889	3,838,912	573,461	594,231	87,605	1,177,596	30,524	79,760	2,534,192	1,304,720	221,567	1,083,104	—21,906
Detroit & Mackinac	400	59,167	23,496	88,274	7,956	23,126	1,958	31,415	117	2,565	67,135	21,138	7,536	13,602	5,803
Duluth & Iron Range	273	768,415	15,034	802,343	90,084	71,981	1,094	146,638	630	10,353	320,780	481,563	43,678	437,884	58,090
Duluth, Missabe & Northern	370	1,264,356	26,432	1,306,772	109,246	114,439	1,811	171,390	2,497	12,996	412,380	894,391	70,330	824,061	478,411
Duluth, South Shore & Atlantic	626	191,407	75,579	294,792	76,122	36,833	9,043	90,854	3,957	8,771	225,580	69,213	21,344	47,869	64,751
El Paso & Southwestern Co	1,027	588,375	119,425	752,000	99,939	90,739	18,926	181,116	6,044	28,856	423,191	328,809	34,889	293,780	—26,835
Elgin, Joliet & Eastern	777	794,043	.....	840,263	88,360	113,996	5,828	219,513	.....	20,974	448,671	391,592	32,900	358,692	163,650
Florida East Coast	745	228,755	107,151	401,109	51,979	53,703	7,425	158,742	3,307	17,802	290,175	110,934	24,131	86,791	95,854
Grand Rapids & Indiana	575	262,538	132,826	428,387	59,613	71,248	11,779	165,487	928	13,911	322,966	105,421	21,513	83,908	18,219
Hocking Valley	351	405,359	66,497	513,082	60,813	90,459	9,163	156,010	1,483	14,375	332,302	180,779	15,472	164,263	22,096
Indiana Harbor Belt	110	.....	.....	250,048	37,130	20,526	2,763	94,528	.....	7,596	162,544	87,505	8,080	79,418	1,998
International & Great Northern	1,160	453,129	137,370	616,843	136,771	129,641	20,809	316,870	3,529	30,736	596,148	20,695	30,000	—9,354	—53,935
Kanawha & Michigan	177	229,433	28,851	264,969	27,736	53,262	3,642	71,843	56	6,550	163,090	101,879	11,761	90,119	58,874
Lake Erie & Western	900	405,697	56,470	485,455	67,099	114,653	11,205	176,589	.....	12,499	382,046	103,410	24,000	79,394	—33,770
Lehigh & New England	296	261,388	1,715	276,223	24,367	34,302	3,152	64,435	.....	7,447	130,956	145,267	8,300	136,684	—12,388
Long Island	398	328,426	839,248	1,345,346	134,545	150,273	7,817	470,233	6,607	36,907	806,382	538,964	77,645	461,191	—36,055
Louisiana Western	208	105,663	52,589	167,308	28,476	27,801	7,468	51,398	1,670	6,308	123,121	44,188	12,023	32,121	—8,305
Louisville, Henderson & St. Louis	200	84,226	33,294	124,813	44,423	17,013	4,860	40,324	.....	4,438	111,059	13,754	—3,375	17,107	—17,808
Maine Central	1,219	653,997	297,734	1,026,623	154,920	145,996	15,913	350,994	2,322	30,836	700,798	325,824	72,815	253,004	5,426
Michigan Central	1,800	1,858,775	888,373	3,118,283	373,914	392,266	62,439	1,046,058	43,328	63,213	1,981,218	1,137,065	121,000	1,015,999	259,952
Missouri & North Arkansas	365	54,264	25,445	85,991	12,571	30,758	1,978	49,614	.....	5,282	100,203	—14,212	5,278	—19,515	—2,273
Missouri, Kansas & Texas System	3,865	1,496,024	656,446	2,379,131	393,248	456,911	53,771	918,773	24,144	87,703	1,910,040	469,091	110,713	357,562	—198,800
Missouri, Oklahoma & Gulf	334	58,292	15,125	76,926	30,226	44,458	4,998	49,861	163	13,275	142,980	—66,054	4,982	—71,073	—63,404
Monongahela	75	113,707	1,877	117,398	23,851	11,231	485	22,390	.....	2,785	60,742	56,657	2,023	54,633	9,028
Morgan's La. & Tex. R. R. & S. S. Co.	405	183,375	81,799	288,070	69,827	49,905	12,403	147,322	2,070	11,801	292,360	—4,291	27,088	—31,804	—93,398
Nashville, Chattanooga & St. Louis	1,231	558,815	201,966	837,324	110,048	147,040	39,761	324,367	7,687	36,297	664,619	172,705	23,842	148,581	—104,293
Nevada Northern	165	129,623	10,858	144,027	20,278	13,666	567	27,690	37	4,373	66,611	77,416	5.005	72,412	5,944
New Orleans & North Eastern	204	216,156	42,745	289,986	27,478	58,710	9,924	89,917	5,753	11,010	201,788	88,198	14,882	72,577	11,628
New Orleans, Texas & Mexico	286	67,362	20,964	98,457	17,244	64,792	3,634	51,774	.....	10,340	147,784	—49,327	1,502	—50,831	—31,548
New York Chicago & St. Louis	569	903,727	114,049	1,058,909	123,248	157,091	62,076	355,621	5,847	22,060	725,943	332,966	22,500	310,460	193,849
New York, Ontario & Western	568	464,640	128,356	714,877	105,239	97,407	10,007	276,040	.....	18,118	506,175	208,702	23,481	185,217	—90,283
New York, Phila. & Norfolk	112	355,705	41,725	427,805	40,986	76,061	4,765	160,060	4,146	10,214	296,232	131,572	8,177	123,395	45,645
Norfolk Southern	900	221,764	75,342	322,596	39,090	41,482	6,851	134,323	73	22,183	244,002	78,594	11,751	66,843	—19,804
Pennsylvania Company	1,757	3,981,191	864,574	5,347,169	650,303	834,051	76,594	1,647,380	30,354	118,257	3,356,940	1,990,229	258,105	1,731,843	391,681
Pennsylvania Railroad	4,528	11,735,317	3,257,416	16,421,567	2,007,790	3,115,954	190,168	5,321,955	212,779	416,726	11,265,371	5,156,195	637,644	4,516,745	948,714
Philadelphia, Baltimore & Washington	717	983,778	631,985	1,794,132	255,253	359,358	26,471	693,612	21	61,448	1,396,163	397,969	54,527	343,409	—9,838
Pittsburgh & Lake Erie	225	1,329,283	123,549	1,513,339	134,721	260,380	12,625	318,099	3,320	27,691	756,837	756,502	49,500	707,002	241,965
Pittsburgh, Cin., Chic. & St. Louis	1,479	2,233,834	713,048	3,328,398	500,581	641,529	61,892	1,162,540	24,818	89,386	2,480,745	847,653	162,255	685,245	—39,646
Rutland	468	171,984	92,599	303,198	42,759	43,856	9,937	109,531	1,061	7,063	214,206	88,991	16,875	72,117	9,073
St. Joseph & Grand Island	258	80,593	25,226	116,732	14,895	24,789	4,394	35,792	.....	4,880	84,749	31,962	7,620	24,317	32,191
St. Louis, Brownsvillle & Mexico	548	113,707	55,976	185,945	31,632	45,263	6,427	63,058	.....	10,456	157,265	28,679	6,500	22,137	15,678
St. Louis Merchants Bridge Terminal	9	.....	431	133,823	14,823	9,959	778	66,333	.....	5,871	97,764	36,059	6,540	29,519	—13,542
Seaboard	3,123	1,076,401	339,712	1,628,736	179,916	242,279	65,487	589.842	8,292	59,722	1,145,537	483,199	86,034	396,774	—155,005
Southern	7,022	2,999,515	1,273,736	4,743,560	560,054	753,508	166,926	1,695,581	28,298	178,125	3,369,890	1,373,670	222,575	1,139,435	366,263
Southern Pacific	6,517	5,175,104	3,150,576	9,342,407	822,426	1,416,805	188,476	2,789,455	183,804	266,470	5,660,039	3,682,367	343,787	3,326,645	602,209
Terminal R. R. Assn. of St. Louis	35	.....	1,715	212,588	19,313	18,349	904	68,736	.....	6,604	113,906	98,682	28,157	70,435	13,859
Toledo & Ohio Central	436	348,125	47,840	424,589	58,697	74,779	7,867	140,325	1,680	9,914	293,261	131,328	25,541	105,787	187,567
Union R. R. of Baltimore	9	93,073	18,886	113,714	17,749	.....	.....	4,460	.....	3,505	25,714	87,999	5,825	82,175	—27,932
Union R. R. of Pennsylvania	31	.....	.....	499,556	30,033	91,633	108	148,055	.....	4,371	274,200	225,356	5,300	220,056	161,632
Vandalia	910	573,542	196,990	871,944	132,475	178,819	22,924	329,666	9,026	22,362	695,273	176,672	34,229	142,432	—13,959
Vicksburg, Shreveport & Pacific	171	69,992	32,806	117,613	27,890	33,268	3,482	31,446	1,908	4,923	102,025	15,589	8,172	6,748	1,600
Virginian	504	412,503	32,799	475,498	74,343	80,726	5,734	92,703	9,352	16,233	274,720	200,777	20,836	179,939	—28,952
West Jersey & Seashore	356	188,349	353,644	593,201	94,384	84,197	11,247	240,626	2,478	13,423	446,355	146,846	28,971	117,871	—39,849
Western Maryland	661	729,504	76,022	844,482	107,774	140,923	21,909	252,463	6,439	20,644	548,286	296,196	27,000	268,337	324,746
Wheeling & Lake Erie	512	499,286	49,078	592,919	69,517	102,553	8,613	181,474	1,368	16,260	379,785	213,134	40,014	173,105	51,824

REVENUES AND EXPENSES OF RAILWAYS

FISCAL YEAR ENDING JUNE 30, 1915

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Alabama & Vicksburg	143	952,941	397,723	1,493,067	225,405	376,690	44,690	570,953	30,465	66,806	1,314,147	178,919	95,241	82,153	—165,543
Atchison, Topeka & Santa Fe	8,513	64,764,400	24,117,973	97,082,746	13,252,019	16,503,328	2,239,174	27,596,115	.....	1,918,616	61,384,299	35,698,446	4,748,259	30,930,100	2,335,974
Atlantic Coast Line	4,702	21,064,188	7,853,539	31,536,475	4,572,651	5,438,461	661,514	11,291,110	110,547	880,377	22,904,157	8,632,318	1,689,157	7,038,197	—2,011,814
Baltimore & Ohio Chicago Terminal	79	.....	8,831	1,555,299	143,093	212,220	10,484	657,186	22,578	54,430	1,084,538	470,761	222,783	247,509	135,309
Belt Ry. Co. of Chicago	24	.....	.....	3,168,166	190,955	290,741	9,582	1,139,685	.....	73,100	1,704,062	1,464,103	140,587	1,323,516	257,653
Bessemer & Lake Erie	204	8,146,082	370,465	8,665,548	659,484	1,900,330	122,476	2,001,288	10,106	142,248	4,759,122	3,906,426	215,585	3,690,770	1,341,469
Bingham & Garfield	27	1,298,287	40,377	1,346,009	122,560	172,917	11,497	229,906	904	23,329	561,113	784,896	33,415	751,481	—315,917
Birmingham Southern	43	470,980	9,840	796,498	155,256	145,302	6,948	298,416	.....	41,599	647,521	148,977	29,191	119,786	—180,966
Buffalo, Rochester & Pittsburgh	586	8,022,690	1,101,981	9,479,936	1,267,254	2,135,354	141,767	3,144,598	14,658	231,621	6,935,252	2,544,683	230,000	2,314,087	—221,487
Canadian Pacific Lines in Maine	233	972,071	284,071	1,297,609	227,060	200,234	67,031	556,235	.....	43,342	1,093,901	203,708	134,936	68,772	203,504
Charleston & Western Carolina	341	1,369,111	309,675	1,767,387	329,144	298,046	41,001	640,636	5	52,787	1,361,344	406,043	64,484	341,502	—87,193
Chicago & Alton	1,033	9,200,547	3,839,893	14,245,624	1,647,541	3,334,943	436,498	5,216,447	115,435	361,520	11,072,707	3,172,917	508,839	2,660,584	1,277,787
Chicago & Northwestern	8,108	51,923,861	20,528,443	80,779,675	10,450,739	12,648,935	1,288,448	29,753,444	604,058	1,764,487	56,371,573	24,408,102	4,516,943	19,883,905	—121,065
Chicago Junction	24	.....	.....	1,976,561	253,948	227,885	12,822	1,093,890	.....	63,661	1,652,207	324,354	23,899	299,810	—156,508
Chicago, Milwaukee & St. Paul	10,071	63,953,799	17,952,428	91,435,374	10,377,185	13,737,535	1,756,801	35,697,961	722,635	1,862,939	61,971,701	29,463,673	4,746,721	24,685,115	—1,931,729
Chicago, Peoria & St. Louis	255	1,108,937	246,907	1,443,538	251,017	283,902	64,870	623,197	.....	58,328	1,281,313	162,224	61,062	101,162	202,696
Chicago, Rock Island & Gulf	477	2,087,728	584,889	2,900,445	368,614	424,803	117,675	1,159,848	21,909	96,260	2,188,174	712,271	93,569	618,038	29,539
Chicago, St. Paul, Minn. & Omaha	1,753	11,523,103	4,983,700	17,841,348	1,956,803	2,476,957	344,363	6,737,697	178,411	433,205	12,107,598	5,733,750	1,015,029	4,713,887	311,203
Cincinnati Northern	246	1,271,187	205,996	1,541,551	250,157	318,531	32,144	514,597	.....	44,308	1,159,737	381,614	64,463	316,594	364,916
Cleveland, Cincinnati, Chicago & St. L.	2,381	24,252,112	8,366,887	35,824,106	4,072,159	7,209,496	917,630	13,830,859	284,396	769,631	27,018,315	8,805,790	1,549,027	7,242,192	4,572,500
Colorado Midland	338	1,325,632	212,276	1,698,780	287,456	386,805	90,885	695,822	13,193	67,015	1,541,176	157,604	109,709	47,895	137,434
Cumberland Valley	164	2,087,500	651,776	2,898,794	492,323	379,043	55,386	981,927	10,314	102,587	2,021,579	877,215	68,836	808,379	—230,953
Delaware, Lackawanna & Western	959	30,495,030	8,234,927	43,044,705	4,784,780	6,919,327	899,597	13,834,369	355,339	908,566	27,411,441	15,633,265	2,105,399	13,526,152	825,100
Detroit & Mackinac	400	695,580	303,072	1,077,317	135,505	200,025	24,668	398,889	1,138	33,512	793,735	281,582	82,491	201,091	—50,458
Duluth & Iron Range	273	4,448,612	214,412	4,824,605	781,014	697,278	12,312	1,137,889	24,568	108,546	2,761,606	2,062,999	248,658	1,814,339	—8,882,287
Duluth, Missabe & Northern	367	5,858,280	318,110	6,290,072	718,495	893,711	23,656	1,176,633	26,196	151,511	2,990,202	3,301,869	326,939	2,974,930	89,643
Duluth, South Shore & Atlantic	627	1,813,059	857,607	2,938,597	570,978	426,748	95,361	1,141,875	45,006	121,867	2,401,835	536,762	197,313	339,342	—66,448
El Paso & Southwestern Co.	1,027	5,898,826	1,327,353	7,788,736	1,021,496	1,075,214	225,199	2,062,308	70,877	288,988	4,729,225	3,059,511	400,743	2,643,392	—299,373
Elgin, Joliet & Eastern	777	8,039,190	59	8,541,355	934,311	1,523,706	68,943	2,537,110	.....	234,898	5,298,604	3,242,751	434,700	2,807,787	—262,504
Florida East Coast	720	2,856,719	1,904,928	5,513,477	697,683	678,192	103,826	1,734,561	39,044	201,433	3,418,531	2,094,947	236,090	1,857,999	416,284
Grand Rapids & Indiana	575	3,139,180	1,760,610	5,315,747	617,644	894,928	130,952	2,242,301	14,277	170,090	4,070,192	1,245,556	274,624	968,444	151,751
Hocking Valley	351	4,912,982	832,733	6,181,153	707,207	1,158,671	110,916	2,033,491	1,483	172,602	4,184,370	1,996,783	418,522	1,577,216	—189,046
Indiana Harbor Belt	110	.....	.....	3,276,224	419,642	310,710	33,532	1,407,233	.....	91,329	2,262,446	1,013,778	92,627	920,433	215,494
International & Great Northern	1,160	6,674,082	1,756,044	9,083,626	1,539,783	1,585,929	269,869	4,121,583	35,041	361,452	7,871,449	1,252,177	400,000	806,500	—754,599
Kanawha & Michigan	177	2,485,446	345,083	2,911,415	386,039	704,977	33,886	861,266	128	77,775	2,064,072	847,343	137,781	709,527	—55,858
Lake Erie & Western	900	4,656,495	743,747	5,683,649	793,064	1,041,865	160,379	2,267,401	.....	147,036	4,409,746	1,273,903	280,541	992,207	244,426
Lehigh & New England	296	2,502,517	15,223	2,646,662	343,776	382,830	26,226	658,731	.....	71,036	1,479,802	1,166,860	67,839	1,098,737	143,342
Long Island	398	3,777,467	7,822,188	13,318,081	1,480,746	1,483,345	129,717	5,548,546	84,062	349,348	9,075,765	4,242,317	863,055	3,376,281	566,594
Louisiana Western	208	1,370,301	666,183	2,186,500	283,848	383,104	82,746	680,557	29,832	76,815	1,536,754	649,746	124,907	524,243	—2,319
Louisville, Henderson & St. Louis	200	917,771	390,199	1,397,190	316,479	193,846	62,794	474,534	.....	40,498	1,088,151	309,039	38,425	270,460	—40,892
Maine Central	1,219	7,195,228	3,350,960	11,350,423	1,630,530	1,745,053	135,734	4,245,565	55,367	332,890	8,143,965	3,206,458	644,785	2,561,482	24,596
Michigan Central	1,800	20,933,986	8,965,557	33,760,735	3,912,685	5,387,581	742,614	13,566,621	570,446	696,224	24,876,172	8,884,563	1,529,350	7,350,275	1,480,134
Missouri & North Arkansas	365	752,684	343,999	1,181,851	334,277	280,933	36,979	612,398	.....	68,458	1,333,045	—151,194	69,815	—221,619	—217,745
Missouri, Kansas & Texas System	3,865	22,397,364	8,096,063	32,898,759	4,502,567	4,579,464	657,215	12,080,328	297,515	1,037,434	22,967,592	9,931,167	1,327,871	8,584,604	1,393,034
Missouri, Oklahoma & Gulf	334	906,513	215,605	1,174,211	276,283	277,163	51,614	566,873	1,312	106,521	1,279,766	—105,555	70,945	—177,113	—95,951
Monongahela	72	1,080,679	23,932	1,125,100	206,949	106,515	6,840	273,942	.....	25,692	619,939	505,162	20,481	484,681	—320,772
Morgan's La. & Tex. R. R. & S. S. Co.	405	2,952,565	1,040,409	4,376,736	582,263	761,070	137,908	1,768,813	18,257	141,496	3,417,456	959,280	246,011	708,858	—92,031
Nashville, Chattanooga & St. Louis	1,231	7,470,181	2,517,075	10,936,533	1,540,305	2,166,005	535,037	4,385,938	104,539	368,763	9,099,622	1,836,911	318,333	1,516,614	—845,665
Nevada Northern	165	1,065,751	98,356	1,204,326	200,481	158,209	6,178	277,968	720	48,379	691,935	512,391	60,265	452,075	—302,172
New Orleans & North Eastern	204	2,625,000	530,609	3,486,255	358,350	737,706	117,580	1,222,324	69,108	138,429	2,642,493	843,762	176,872	666,151	—65,100
New Orleans, Texas & Mexico	286	1,150,078	242,981	1,475,591	292,237	275,226	45,108	617,810	.....	115,887	1,346,269	129,322	19,092	110,051	14,351
New York, Chicago & St. Louis	568	9,616,030	1,313,084	11,413,775	1,321,580	1,704,457	534,017	5,196,031	61,179	245,782	9,063,046	2,350,729	453,767	1,895,989	335,926
New York, Ontario & Western	568	6,073,891	1,546,407	8,926,946	1,144,018	1,590,402	101,817	3,516,756	.....	190,640	6,542,996	2,383,950	242,455	2,141,440	39,080
New York, Phila. & Norfolk	112	3,025,334	480,527	3,816,460	363,001	781,533	52,563	1,649,373	54,041	122,216	3,022,725	793,734	111,477	682,026	75,497
Norfolk Southern	900	2,587,837	1,005,437	3,875,875	527,681	602,424	86,694	1,518,599	989	237,490	2,973,878	901,998	130,943	769,671	—176,785
Pennsylvania Company	1,757	38,588,848	9,656,407	53,652,932	7,632,721	9,996,685	917,694	19,691,314	412,916	1,360,943	40,012,274	13,640,659	3,127,319	10,510,141	—1,168,567
Pennsylvania Railroad	4,528	128,866,466	38,063,674	183,671,208	24,363,415	37,227,559	2,419,005	67,927,529	2,666,808	4,956,595	139,560,911	44,110,297	7,710,954	36,375,649	593,207
Philadelphia, Baltimore & Washington	717	9,996,599	8,163,677	20,255,253	3,041,431	3,907,561	323,478	8,573,368	227	572,929	16,418,995	3,836,258	673,735	3,161,192	270,336
Pittsburgh & Lake Erie	225	12,433,807	1,584,787	14,639,732	1,732,413	3,091,720	174,493	3,857,924	40,040	332,512	9,229,102	5,410,630	607,596	4,802,908	—1,226,293
Pittsburgh, Cin., Chic. & St. Louis	1,479	26,076,723	7,951,125	38,412,030	5,119,943	7,604,474	779,174	14,369,824	292,494	970,560	29,136,470	9,275,560	1,936,949	7,334,262	354,456
Rutland	468	1,925,496	1,139,731	3,479,389	419,903	584,622	101,432	1,356,857	13,558	70,679	2,547,051	932,338	204,466	727,746	44,697
St. Joseph & Grand Island	258	1,098,714	296,705	1,507,314	250,822	247,677	56,167	556,999	.....	61,260	1,172,925	334,389	95,263	238,792	142,456
St. Louis, Brownsville & Mexico	548	1,385,605	707,874	2,292,561	399,080	271,633	66,608	833,749	.....	128,227	1,690,068	602,492	76,402	525,267	61,280
St. Louis Merchants Bridge Terminal	9	.....	2,347	1,813,408	227,537	91,804	9,386	914,266	.....	74,704	1,317,697	495,711	83,189	412,507	167,015
Seaboard	3,123	14,324,670	4,576,795	21,280,463	2,414,866	3,175,642	764,298	7,792,905	114,014	663,066	14,922,534	6,357,928	1,062,247	5,286,779	—1,671,018
Southern	7,022	40,458,858	16,175,674	62,199,510	8,452,119	10,691,267	2,110,467	22,757,597	388,229	2,019,621	46,174,711	16,024,799	2,595,829	13,400,055	—2,910,903
Southern Pacific	6,517	58,123,448	28,866,918	97,099,099	10,069,225	14,311,991	2,001,374	31,065,806	1,719,263	2,771,068	61,652,012	35,447,088	4,635,447	30,772,596	—1,835,681
Terminal R. R. Assn. of St. Louis	35	.....	3,777	2,687,884	220,330	158,953	10,991	937,887	.....	64,064	1,392,225	1,295,659	342,330	953,239	338,603
Toledo & Ohio Central	436	4,055,445	592,404	4,946,740	746,798	959,765	92,426	1,886,633	21,041	119,654	3,826,318	1,120,421	267,957	850,470	344,986
Union R. R. of Baltimore	9	1,314,793	252,557	1,588,307	165,360	.....	.....	55,001	.....	30,932	251,293	1,337,014	69,124	1,267,890	—22,414
Union R. R. of Pennsylvania	31	.....	.....	3,645,074	466,505	1,112,349	1,424	1,555,098	.....	43,329	3,178,705	466,369	45,975	420,394	205,192
Vandalia	910	7,406,614	2,350,668	10,972,885	1,476,797	2,230,981	281,539	4,320,920	113,053	263,162	8,686,453	2,286,433	394,263	1,891,550	—139,622
Vicksburg, Shreveport & Pacific	171	795,808	433,573	1,386,737	260,758	333,111	42,642	529,400	26,221	60,360	1,251,599	135,137	88,679	45,790	—270,804
Virginian	504	5,070,491	387,083	5,820,406	756,274	1,025,056	65,103	1,305,981	117,004	140,827	3,376,851	2,443,554	253,336	2,189,974	—442,561
West Jersey & Seashore	356	1,918,222	4,028,689	6,534,491	1,105,501	1,016,177	148,343	2,813,701	31,211	165,323	5,280,256	1,254,235	343,627	910,264	—33,140
Western Maryland	661	7,326,471	948,777	8,683,459	1,204,048	1,479,331	260,136	3,056,078	38,046	229,063	6,257,412	2,426,047	306,000	2,119,188	1,965,041
Wheeling & Lake Erie	512	4,385,421	553,630	5,428,069	604,591	1,043,748	112,250	2,088,758	15,318	175,074	4,039,740	1,388,329	385,907	1,002,407	—962,525

drawing room, $30. After the convention some of the members and guests will doubtless desire to make a tour of California to visit the expositions at San Francisco and San Diego. If a sufficient number desire to make this trip, one or more Pullman sleeping cars will leave Salt Lake City at 12:30 a.m., Friday, September 17, on the Oregon Short Line to Ogden, thence over the Southern Pacific to San Francisico, arriving there at 9:30 a.m., September 18. It is important that reservations for this trip be made as soon as possible with H. A. Gross, general agent, passenger department, Chicago & Northwestern, 48 South Clark street, Chicago, or W. D. Lifsey, New York Central, New York, and that C. C. Rosenberg, Sec.-Treas., Railway Signal Association, Bethlehem, Pa., be notified also.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 2-5, 1916, Atlanta, Ga.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, August 19-20, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 17, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 21-23, 1916, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June, 1916.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 7-10, 1915, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 18-20, 1916, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8, Woodward Bldg., Washington, D. C. Annual meeting, June 28, 1916, Detroit, Mich.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next meeting, May 19, 1916, Atlantic City, N. J.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Associations. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 20-22, 1916, St. Paul, Minn.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 14-15, 1915, St. Louis, Mo.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought. 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. E. & P., Richmond, Va. Annual session, May 17, 1916, Washington, D. C.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-16, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June, 1916.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 349 People's Gas Bldg., Chicago. Next convention, March, 1916, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May. Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anlerson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPER'S ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C., Collingwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, October 19-21, Colorado Springs, Col.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Annual meeting, January, 1916.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramappo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washintgon, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Hotel Astor, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., October to May.
St. Louis, Mo. Annual meeting in November. Noonday meetings

TRAIN DISPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 21, 1916, Toronto, Ont.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Annual meeting, September 7-10, 1915, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, exceppt July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

The summer meeting of the National Industrial Traffic League will be held in Toledo, Ohio, on September 9 and 10. The question of legislation to be urged at the next session of Congress is one of the important subjects to be considered.

At Pinner's Point, Norfolk, Va., the Southern Railway has made extensive additions to its stock pens and other facilities, to accommodate the present extensive export traffic in horses. The French government has recently bought 10,000 horses to be shipped through this port.

According to newspaper reports from Seattle, Frank Waterhouse & Co., of that city, have chartered seven vessels to transport 7,500 freight cars to Vladivostok for delivery to the Russian government. Six thousand cars are to be shipped from New York City through the Panama Canal and 1,500 are to be shipped from Puget Sound ports. The average capacity of the vessels chartered is 150 cars for each trip.

Plans are being made for conferences between the lumber interests and railroad traffic officers for the purpose of working out some changes in the lumber classification. A. Fletcher Marsh, chairman of the traffic committee of the National Hardwood Lumber Association, has sent out a circular letter to members of that association and other lumber interests, announcing that as the result of a conference with Eugene Morris, secretary of the Railroad Classification Committee and of the Central Freight Association, Mr. Morris will be glad to hear from the representatives of the influential lumber organizations of the country as to whether they prefer that the traffic representatives of the railroads should meet with the lumbermen first for local consideration of classifications, or whether a general conference should be called at which the lumbermen of the country could present to the railroads the question of classification. Each association is asked to advise Mr. Morris that such conferences would be of material benefit in ironing out certain questions and whether local conferences should or should not be first called. The letter states that many lumbermen have already strongly expressed the opinion that while lumbermen may not be able to agree on all matters they will all agree that they cannot stand an advance in freight rates, but should have help in being able to remove the largest amount of material from every acre logged.

The Continuous Railway Voyage

[From the New York Times.]

The Interstate Commerce Commission is as up-to-date as England in applying the doctrine of the continuous voyage. A shipment intended to move from Kansas to Oklahoma was not sent direct; it was shipped in the first place to another town in Kansas, and then was rebilled to Oklahoma at an interstate rate. The Commission declares that "first billing to an intermediate point of a shipment that is really intended to reach a destination beyond is simply a device for defeating the lawful through rate, and is unlawful." It would seem to require a mind reader, or a detective, to tell what the rates are in the numerous cases in which a combination of local rates can be used to make a rate lower than the interstate rate.

When such cases used to arise they were put down to original sin on the part of the railways. Now that rates are government made, the railways must carry at the lowest lawful rate, or fifty Commissions would want to know the reason why.

Imagine the dilemma of the Commission if it sought to apply the doctrine of continuous journey to passenger fares. At the present moment it costs $6 for a round trip to Atlantic City from New York, but $5 from towns across the river in New Jersey. Would it be lawful to sell a tunnel ticket to a traveler designing to buy a $5 ticket to the New Jersey abode of bliss? Would it be lawful for a railway in New Jersey to decline to sell a $5 ticket if the buyer came from New York to get it? Must passengers and shippers file affidavits of intention when they apply for lawful and public rates?

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has decided, in the complaint of the Mobile Cotton Exchange and others, that on or before October 1 next, rates by railroad for the transportation of export cotton must be no higher to Mobile than to Savannah or other South Atlantic ports or gulf ports. This order applies to points of origin in the territory lying east of the line of the Louisville & Nashville through Decatur, Birmingham and Montgomery. The carriers are also ordered to establish two scales of rates, one for shipside delivery, no higher than the present rate, and one for station delivery, which shall be at least 3 cents per 100 lbs. less than the shipside rate, and the shipside rate must apply to any dock in Mobile which is served by any of the roads which are defendants in this proceeding. The rate from a station in Mobile to a dock or wharf must be not over three cents per 100 lbs. The carriers are required also to issue through bills of lading to any dock in Mobile at which any of the defendant carriers make shipside delivery.

Rates on Ore from Baker, Ore.

Columbia Gold Mining Company v. Oregon-Washington Railroad & Navigation Company et al. Opinion by the Commission:

The commission finds that the carrier has justified the cancellation of a joint rate on ore and concentrates in carloads from Baker, Ore., through Portland, Ore., to Tacoma, via. the Northern Pacific from Portland, leaving applicable a combination rate based on Portland higher than the rate cancelled and also higher than the rate applying on the Oregon-Washington's through line. (35 I. C. C., 42.)

Rates on Low-Grade Cedar Logs

Nebraska Bridge Supply & Lumber Company v. Nashville, Chattanooga & St. Louis et al. Opinion by the Commission:

The commission finds that the rates on low-grade cedar logs in carloads from Burrows Switch, Guntersville, Stevenson, Huntsville, Bridgeport and Montague, Ala., and Belvidere and Jasper, Tenn., to Atlanta, Ga., are unreasonable to the extent that they exceed rates contemporaneously in effect on common logs in carloads from and to the same points. Rates for the future are prescribed accordingly. (34 I. C. C., 86.)

STATE COMMISSIONS

The Michigan Railroad Commission has authorized the Pere Marquette to discontinue the operation of trains on the Kalkaska branch from Spencer to Stratford, effective on August 14.

The Public Utility commissioners of New Jersey have denied the application of people in Long Branch, Asbury Park and other places for an order to require the Pennsylvania railroad to run more passenger trains between Trenton and the seacoast.

The Louisiana Railroad Commission has suspended its order of June 23 requiring the railroads of the state to report accidents on blanks identical with those used by the Interstate Commerce Commission. It appears that the Interstate Commerce Commission has adopted new forms, which the Louisiana Commission will consider more in detail before deciding to conform to the federal regulations.

The State Railroad Commission of Texas by a recent order requires the general free concentration of cotton. The order says: "Railroad companies are required to concentrate cotton and cotton linters, without additional charge, at the option of the owner or shipper, once at any available point in Texas in line of shipment from origin to destination, and a second time, without additional charge, at Houston, Beaumont or Aransas Pass, or at the port of destination, and before delivery at the wharf; and to carry the concentrated cotton or linters forward to ulti-

mate destination at the request of the owner or shipper, made during the season of shipment and not afterwards; it being understood that the identity of cotton or linters through concentrating point need not be maintained."

COURT NEWS

The Missouri Pacific has filed suit in the United States district court at Lincoln, Neb., to have the Nebraska two-cent fare law declared null and void.

The hearing before Judge Youmans, of the United States district court at Oklahoma City, on the application of the railroads for an injunction against the Oklahoma two-cent fare law was adjourned on July 31, until September 6, because the state was not ready to complete the cross-examination of certain of the railroad witnesses.

Traffic organizations of Sacramento, San Jose, Stockton and Santa Clara, Cal., have secured an order from the United States district court, at San Francisco, directing the United States government, the Interstate Commerce Commission and six railroads to show cause why an interlocutory injunction should not be entered to prohibit the taking effect of new tariffs filed by the railroads accordance with an order of the Interstate Commerce Commission under which the cities mentioned do not have the benefit of "terminal" rates.

Duties to Passengers at Stations—Excessive Damages

Action was brought against a railroad for injuries sustained while attempting to board a train at a flag station. While the plaintiff was trying to reach her coach she stumbled over a log and the jury awarded her punitive as well as compensatory damages. The trial judge had instructed the jury that she was a passenger, and that to a passenger a railroad owes the highest degree of care. It was held by the Arkansas Supreme Court, on appeal, that this instruction was improper, as placing too high a degree of care upon the defendant. A railroad is not liable for the same high degree of care in maintaining its station premises in safe condition as it is in maintaining roadbeds, tracks, cars, and other appliances in such conditions, where the highest degree of care is called for. Some of the decided cases seem to lose sight of this distinction. The evidence, at most, pointed to nothing more than negligence, and mere negligence, however gross, is not sufficient to warrant the infliction of punitive damages.—Chicago, R. I. & P. v. Owens (Ark.), 177 S. W. 8.

Consignor's Liability for Freight Charges

In an action against the consignors for freight charges the defense was that the goods were shipped on condition that the consignee should pay and the company had neglected to collect. The New York Appellate Division holds that testimony offered by the consignors of the company's agreement to accept the goods on condition of collecting the freight charges from the consignee was inadmissible, as being parol evidence tending to vary the terms of a written instrument, namely, the bill of lading. Nor did the mere fact that the charges were not to be prepaid establish an agreement on the part of the railroad to accept the goods on condition of collecting the freight charges from the consignee.—Pennsylvania v. Reifel (N. Y.), 154 N. Y. Supp. 203.

Liability for Injury to Passenger Shot by Another Passenger

A porter wrongfully assaulted a passenger, P., who, in the course of a prolonged struggle, shot at the porter and accidentally hit another passenger, J. In an action against the railroad for J's injuries, it was held by the Arkansas Supreme Court that the wrongful assault upon P. was the proximate cause thereof, rendering the railroad liable. The servants in charge of the train knew of the difficulty, and should have anticipated that injury might result to other passengers because of the conduct of the porter; and the railroad's duty required it to protect such other passengers from resultant injury whether inflicted by its servants in the assault, or unintentionally by the assaulted passenger, in protecting himself against the wrongful assault of the servant.—St. Louis, I. M. & S. v. Jackson (Ark.), 177 S. W. 33.

Undercharging Passenger—Company May Recover Difference

A passenger bought a return trip ticket between Adams, N. Y., and New York city. The tariff rate was $13.56, but through a mistake the agent charged only $7.50. The passenger used the ticket and the railroad subsequently sued him for the difference. The defendant claimed misrepresentation on the part of the agent, inducing the defendant to buy. Under the decided cases, this would be no defense in regard to freight rates, and the Jefferson County Court holds that the same rule applies in passenger rates. The railroad has no option, but must demand and collect the tariff rates. New York Public Service Commission Law, section 31, provides that no common carrier shall receive compensation for transportation of passengers, freight or property less than authorized by the act. The company was therefore held entitled to recover the difference.—New York Central v. Shelmidine (N. Y.), 154 N. Y. Supp. 235.

Passenger Killed Resisting Arrest

A disturbance having arisen on a train, the conductor asked an officer to arrest one of the passengers. The passenger resisted arrest and was killed by the officer. Action was brought against the railroad for his death, on the theory that it was caused by the alleged false statement made by the conductor to the officer that the deceased had been making a disturbance. The Kentucky Court of Appeals held that, assuming it to be true that the conductor falsely stated to the officer that the deceased had been guilty of boisterous conduct, and requested the officer to arrest him, that was not the proximate or direct cause of the death. If the deceased had submitted to arrest, as it was his duty under the law to do, whether the charge against him was true or untrue, he would not have lost his life.—Chesapeake & O. v. Whitaker (Ky.), 177 S. W. 443.

No Duty to Guard Yards or Cars Against Children

Action was brought for the death of a seven-year-old boy found dead in a gondola car in the Northern Pacific's yard at Helena, Mont., the car door having fallen upon him. It was alleged that the car was out of repair, the appliances for keeping the door in place being broken or missing; and that because of this defect the car was a dangerous instrumentality, and because of its shape and the fact that large holes had been burned in its sides, it was unusually attractive to young children, and constituted an implied invitation to them to go on the company's property. This is the first time the Montana Supreme Court has had occasion to make direct application of the doctrine of the turntable cases. Every court, it said, which applies the turntable doctrine predicates liability upon the negligence of the landowner—his failure to discharge a duty which he owes to the injured person. Some of these courts treat the injured party as a trespasser, but excuse the trespass because he was tempted into the place of injury by the wrongful act of the landowner in maintaining the attractive nuisance. Others treat the injured child as rightfully upon the premises by virtue of an invitation impliedly given by the maintenance of the dangerous and attractive instrument; while others hold that a landowner who maintains on his premises an instrumentality of the character of an unguarded and unlocked turntable, with knowledge of its attractiveness to children of tender years, of its potentiality for harm, and the probability that such children will be attracted to it, shall not be heard to say that a child of that class, attracted to and injured by the device, was wrongfully where his childish instincts naturally led him to be. Under either theory of the doctrine, the court held that an instruction to the jury that if an owner of property maintains exposed thereon something which is peculiarly and unsually attractive to children, and such children are attracted by such thing, they are not trespassers, was erroneous, because it omitted the element of knowledge by the owner that the device was dangerous and alluring to children. Aside from the turntable doctrine, it was held that in the absence of a statute or ordinance requiring it, a railroad owes no duty to guard its yards or cars so as to prevent children from going on them, even if it has on previous occasions assumed such a duty.—Martin v. Northern Pacific (Mont.), 149 Pac. 89.

Railway Officers

Executive, Financial, Legal and Accounting

Charles L. Lowe, assistant secretary and assistant treasurer of the Chicago & North Western, has been appointed auditor of expenditures, with headquarters at Chicago, succeeding Dr. W. H. Stennett, deceased.

Osmer Charles Hill, whose appointment as general superintendent of the Kansas City Terminal Railway, with headquarters at Kansas City, Mo., has been announced, was born on May 7, 1873, at Hiram, Ohio. He was educated in the public schools and the academy at Hiawatha, Kan., and went one year to Washburn College at Topeka, Kan., and one year to the state university at Lawrence, Kan. He entered railway service on April 5, 1895, with the Chicago, Burlington & Quincy at Hannibal, Mo., and worked as brakeman until 1900 when he was made conductor. In 1903 he was made conductor and brakeman for the Wabash at Moberly, Mo., and in 1904 he was brakeman for the El Paso & North Eastern at El Paso, Tex. In the latter part of 1904 he returned to the Chicago, Burlington & Quincy and worked as switch foreman at North St. Louis, Mo., until 1906, when he went with the Missouri, Kansas & Texas as conductor and brakeman at Parsons, Kan. In 1907 he again returned to the Chicago, Burlington & Quincy, this time as night yardmaster at St. Louis, Mo., and was subsequently general yardmaster at St. Joseph, Mo., from September, 1910, to January, 1913; general yardmaster at Kansas City, Mo., from January, 1913, to September, 1913; general yardmaster at Galesburg, Ill., from September, 1913, to January, 1915, and assistant superintendent at Kansas City, Mo., from January, 1914, to July, 1915, from which position he is now promoted.

O. C. Hill

Operating

E. C. Huffman, formerly assistant superintendent of the Sioux City division of the Great Northern, has been appointed superintendent of the Breckenridge division with headquarters at Breckenridge, Minn., and J. A. MacKinnon, superintendent at Willmar, Minn., Minn., has been transferred to the Sioux City division with headquarters at Sioux City, Iowa.

L. L. Brown, chief despatcher of the Pacific system of the Southern Pacific at Sparks, Nev., has been appointed acting assistant superintendent succeeding George Geiger. F. F. Small has been appointed chief despatcher at Sparks, Nev., vice Mr. Brown, and G. G. Porter has been appointed assistant chief despatcher succeeding Mr. Small.

M. H. Cahill, superintendent of the Baltimore & Ohio at Baltimore has been appointed superintendent of the Cumberland division with headquarters at Cumberland, Md., succeeding C. Le French, deceased. P. C. Allen, superintendent at Philadelphia, succeeds Mr. Cahill, and S. T. Cantrell, formerly assistant superintendent at Cumberland, who has been serving as acting superintendent of the Cumberland division, has been transferred to Philadelphia to succeed Mr. Allen.

W. H. DuFrance, superintendent of the Louisiana division of the Texas & Pacific, has had his headquarters moved from Alexandria to New Orleans, La., and the New Orleans division, of which J. H. Elliott, recently appointed general superintendent, was division superintendent, has been divided between the Louisiana and the Eastern divisions, under the jurisdiction of Mr. DuFrance and of Mr. W. M. Lynch, superintendent of the Eastern division, with headquarters at Marshall, Texas.

C. A. Vermillion, superintendent of car service and telegraph of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., has had his jurisdiction extended to include the Spokane & Inland Empire and the Great Northern Pacific Steamship Company. A. J. Davidson, superintendent of the Portland division, has had his jurisdiction extended to include the Vancouver division and the Oregon Trunk, succeeding F. A. Brainerd, who has been granted an indefinite leave of absence on account of ill health.

Traffic

W. B. Knight, chief of the tariff bureau of the Missouri Pacific-Iron Mountain system, has been appointed assistant freight traffic manager, with headquarters at St. Louis, Mo. The office of chief of tariff bureau is abolished.

Engineering and Rolling Stock

J. A. MacRae has been appointed mechanical engineer of the Louisville & Nashville with headquarters at the South Louisville shops, effective August 1.

Joseph Peter Heinzer has been temporarily appointed road foreman of engines of the Northern Pacific at Pasco, Wash., in place of Robert Erwin Wilkinson.

M. C. Blanchard, office engineer of the Atchison, Topeka & Santa Fe at Topeka, Kan., has been appointed engineer of the Eastern district, Eastern lines, with headquarters at Topeka, and E. H. Olson succeeds Mr. Blanchard.

Joseph Weidel has been appointed valuation engineer of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, succeeding H. C. Phillips, who recently resigned to become assistant secretary of the president's conference committee on the federal valuation of railroads.

G. J. Bell, division engineer of the Atchison, Topeka & Santa Fe at Marceline, Mo., has been appointed engineer of the Western district, Eastern lines, with headquarters at Newton, Kan., W. C. Baisinger, division engineer at Chanute, Kan., succeeds Mr. Bell and H. A. Hatch succeeds Mr. Baisinger.

M. C. Bryan, division engineer of the Los Angeles division of the Atchison, Topeka & Santa Fe, Coast Lines, at San Bernardino, Cal., has been transferred to the Albuquerque division, with headquarters at Winslow, Ariz., and W. H. Oliver, division engineer at Needles, Cal., succeeds Mr. Bryan. W. L. Bradley, division engineer of the Valley division at Fresno, Cal., succeeds Mr. Oliver, and E. E. Ball, division engineer at Los Angeles, Cal., succeeds Mr. Bradley.

Purchasing

E. J. Price, traveling storekeeper of the St. Louis & San Francisco, has been appointed general storekeeper, with headquarters at Springfield, Mo., succeeding H. M. Powell, resigned, and R. A. Jacobs succeeds Mr. Price.

OBITUARY

J. J. Moran, formerly master mechanic of the Houston & Texas Central at Ennis, Tex., died on July 29, at Marlow, Okla., at the age of 66 years.

SWEDISH RAILWAY OPENED.—The Swedish State Railways have announced that the railroad from Karungi to Haparanda, on the Russian frontier, is open for traffic. It was previously necessary to make the journey by wagon.

IMPROVEMENTS AT GLASGOW QUEEN STREET STATION.—The North British Railway Company has entered upon a scheme of improvements at Queen Street Station, Glasgow, which will involve an expenditure of about $200,000.

LIGHTING ITALIAN RAILWAY CARS.—The Italian Ministry for Posts and Telegraph, on December 26, 1914, made an agreement with the state railways for the electric lighting of all the mail cars and compartment cars used for the transportation of mails, and for the oil lighting of all mail cars provided with the proper apparatus, whether such cars are owned by the post office or the railways.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE GILCHRIST-FORDNEY LUMBER COMPANY, Laurel, Miss., is in the market for a light locomotive.

THE RICHMOND, FREDERICKSBURG & POTOMAC, which was reported in the *Railway Age Gazette* of July 9 as being in the market for 6 Pacific type locomotives, has ordered these locomotives from the Baldwin Locomotive Works.

CAR BUILDING

THE NATURAL GUANO COMPANY, Aurora, Ill., is inquiring for two flat cars.

THE AMERICAN STEEL & WIRE COMPANY is said to be inquiring for 100 tank cars.

THE NEW YORK CENTRAL is said to be inquiring for 1,000 gondola cars for its own use.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is building 200 36-ft. box cars in its own shops.

THE CHESAPEAKE & OHIO has ordered 50 caboose cars from the American Car & Foundry Company.

THE CHICAGO GREAT WESTERN has ordered 500 reinforcing sills from the American Car & Foundry Company.

THE CUBAN CENTRAL has ordered 50 15-ton narrow-gage box cars and 25 15-ton flat cars from the Standard Steel Car Company.

THE GADSDEN CAR WORKS are reported to have ordered 600 center constructions from the Mount Vernon Car Manufacturing Company.

THE CINCINNATI, HAMILTON & DAYTON is said to have ordered 500 center constructions from the Haskell & Barker Car Company. This item has not been confirmed.

MACHINERY AND TOOLS

THE LEHIGH & NEW ENGLAND has issued specifications for 27 machine tools for its new shops at Pen Argyle.

SIGNALING

THE CHICAGO, BURLINGTON & QUINCY is installing automatic block signals between Savannah and Galena Junction, Ill.

Light Signals on the St. Paul

The Chicago, Milwaukee & St. Paul has placed an order with the Union Switch & Signal Company for material for 130 miles of single-track, automatic block signaling, which will be installed by company forces on the Rocky Mountain division in Montana, the district which is now being electrified. The installation will consist of changing two existing D. C. sections from Lennet to Three Forks, 78.5 mi., and from Piedmont to Butte Yard, 35.5 mi. over to A. C. operation and the addition of 16 mi. of new signaling from Butte Yard to Finlen. Semaphores will not be used, Union model 14, three-position, light signals having been adopted as being more readily adaptable to the adverse conditions due to the propulsion power line, which interferes somewhat with the view of enginemen. The propulsion current will be 3,000 volts, D. C., taken from an overhead conductor. The signal feeder current will be 4,400-volt, single-phase, 60-cycles. The power for the signals will be secured from the electrification sub-stations, which will be located from 28 to 42 miles apart, the system being arranged so that power can be fed between such stations in either direction. Sectionalizing line switches will be installed in the signal power wires at the railroad stations, which are from four to nine miles apart. Impedance bonds of 500 amperes per rail capacity will be used except on the 2 per cent grade, where 1,500-ampere per rail bonds will be installed.

Supply Trade News

W. Van Ausdall, an electrical engineer of Cincinnati, Ohio, has been appointed superintendent of the C. & C. Electric & Manufacturing Company, Garwood, N. J.

The Canadian Car & Foundry Company, which has been working on an $83,000,000 order for steels for some time is now reported to have received an additional order for $71,000,000.

S. J. Turreff, heretofore superintendent of construction of the Federal Signal Company, Albany, N. Y., for its western district has been appointed office engineer with headquarters in New York.

Thomas Cantley, vice-president of the Nova Scotia Steel & Coal Company, Halifax, N. S., has been elected president of that company succeeding R. E. Harris who has resigned to become a member of the Nova Scotia Supreme Court. The vice-presidents of the company now are J. D. McGregor and D. W. Ross.

W. E. Moore, vice-president and general manager of the West Penn Traction properties, has resigned his position with the various West Penn companies to go into business under his own name, as consulting engineer, with an office in Pittsburgh. As Mr. Moore's successor has not yet been appointed, he will continue with the company until the staff can be reorganized.

The Spray Manufacturing Company, Boston, Mass., recently incorporated to construct spray cooling systems, gas scrubbers, odor and fume condensers, etc., has changed its name to the American Spray Company, as it will engage in general engineering work involved in the use of spray systems. The management of the company remains unchanged.

TRADE PUBLICATIONS

NATIONAL PIPE.—Bulletin No. 20, recently issued by the National Tube Company, Pittsburgh, Pa., is an index to bulletins 1 to 20 which have been issued by this company. The bulletin represents an index of considerable detail, the idea being to offer pipe information readily accessible to the reader. The last two pages of the bulletin give a detailed list of the bulletins to which reference is made.

CHICAGO GREAT WESTERN.—The passenger department has just issued an illustrated booklet entitled "Modernizing a Railroad," setting forth some of the various improvements effected by the railroad since its reorganization. These include the expenditure of some $17,000,000 for installing new and heavier rails, double tracks, straightening, regrading and reballasting the roadbed, building new bridges, purchasing new all-steel passenger cars and larger and heavier locomotives, automatic block signals, telephone train despatching, etc.

FIRE ALARM AND SIGNAL CALLS.—The McFell Signal Company, Chicago, Ill., has issued two folders describing several new types of the McFell fire alarm signal system, which are electrically operated and are designed for a variety of different uses. They also describe the McFell direct signal call system designed for communicating promptly with the members of the superintending force of a large plant or office building, whose duties call them to different parts of the establishment and who by this system can be readily located by the signal sounding in each department.

LOCOMOTIVES FOR PLANTATION SERVICE.—Record No. 80, recently issued by the Baldwin Locomotive Works, is devoetd to the subject of locomotives for plantation service. In the booklet there are shown 29 different designs of locomotives suitable for this kind of work. They vary in type and capacity from light, four-coupled engines, suitable for switching service and short hauls, to large engines of the Consolidation type, which are qualified for road service. Information is given covering the hauling capacity of each locomotive illustrated, as well as the other principal general dimensions.

Railway Construction

ALAMANCE, DURHAM & ORANGE.—Graham, the county seat of Alamance county, N. C., and Thompson's township, according to report, have voted $55,000 bonds to aid the construction of this electric line, which it is proposed to build from a point in North Carolina, southeast via Burlington, Graham and Haw River to Saxapahaw, thence east to Chapel Hill, and northeast to Durham, about 50 miles. Junius H. Harden, president, Burlington. (March 12, p. 493.)

CANADIAN GOVERNMENT RAILWAYS.—An officer writes that a contract has been awarded to the John W. McManus Company, Ltd., Memramcook, N. B., for the construction of a spur line of railway from a point on the main line of the Intercolonial, about 1.8 miles east of the station at Bathurst, N. B., to a point at or near the Bathurst Lumber Company's mills, a distance of a little over two miles. The contract is to be completed by October 1, 1915. C. B. Brown, chief engineer, Moncton, N. B.

FENTRESS & MORGAN.—This is the name of a line which is reported under construction from the head of Island Creek in Morgan county, Tennessee, to the confluence of Daddy Creek and Obed river, 3 miles. It is said that the line will be ultimately 18 miles long, and that it will traverse territory being developed by the Tennessee Mineral & Lumber Company, Harriman, Tenn. It connects with the Cincinnati, New Orleans & Texas Pacific at Nemo, Tenn.

FLORIDA, ALABAMA & GULF.—This line, which now connects with the Louisville & Nashville at Galliver, Fla., and runs north via Baker, Blackman and Wing to Falco, Ala., about 31 miles, will be extended to connect with the railroad of the Horseshoe Lumber Company, at Falco, over which it has been granted trackage rights. The railway will thus be enabled shortly to run its trains to Andalusia, Ala., 22 miles farther. Thomas A. Johnson, receiver, Pensacola, Fla.

GARYVILLE NORTHERN.—It is reported that the Lyon Cypress Lumber Company, Garyville, La., has chartered a railway by this name to build about 35 miles of line. The work will be done by company forces.

GEORGIA ROADS.—A proposition has been submitted to the Americus Chamber of Commerce by T. B. Ragan, president of the Hawkinsville & Western and others of Hawkinsville, Ga., to build a line between Americus, Ga., and Hawkinsville, as an extension of the proposed line to be built from Byromville west to Americus, about 25 miles, by the Georgia Lumber Company, Byromville, Ga. (See Americus, Flint River & Gains, July 2, p. 38.)

KANAWHA, GLEN JEAN & EASTERN.—A contract has been let to Board & Duffield, Charleston, W. Va., for building the Dun Loup branch of this line from the main line to the mines of the Dun Loup Coal & Coke Company at Dun Loup, one-half mile. Construction work is now under way, but track will not be laid before September 15. V. S. Veazey, chief engineer, Glen Jean, W. Va. (June 4, p. 1181.)

KANKAKEE & URBANA TRACTION.—This company will extend its line from Ludlow to Paxton, Ill., following the Illinois Central tracks. The contract for grading will probably be awarded about October 1. There will be one steel plate girder bridge.

KETTLE VALLEY RAILWAY.—This company has awarded a contract to A. Guthrie & Co., St. Paul, Minn., for the building of snowsheds on its line along the Coquihalla river in the Hope Mountains. There will be about 7,500 lineal ft. of sheds, requiring about 13,000,000 ft. B.M. of timber. The work has been started.

MERIDIAN & DEEPWATER.—An officer writes that work on the construction of this railway, which is to be built from Meridian, Miss., east via Causeyville, Blankstown, Yantley, Ala., and Pennington, to Myrtlewood, will be resumed in December of this year. S. A. Neville, Meridian, Miss., is vice-president. (September 15, 1911, p. 544.)

NEW YORK SUBWAYS.—The Public Service Commission, First district, has awarded contracts as follows: To Holbrook, Cabot & Rollins Corporation, the contract for Section No. 3 of Routes Nos. 4 and 36 of the Broadway subway in Manhattan; this section extends from 38th street northerly under Broadway to Times Square, thence northerly under Seventh avenue to 51st street. To Rodgers & Hagerty, Inc., for Section No. 3 of Route No. 12, of the Eastern Parkway subway in Brooklyn; this section extends from about Nostrand avenue easterly under Eastern Parkway to Buffalo avenue. To Post & McCord, Inc., for Section No. 1 of Route No. 49, the Culver elevated line in Brooklyn which extends from a point near 37th street over Gravesend avenue to a point near Bay Parkway or 22d avenue produced.

The Public Service Commission has laid out Route No. 61, providing for a new tunnel under the East River from 60th street, Manhattan, to the Queensboro Bridge Plaza in the Borough of Queens, where it will connect with the new rapid transit lines in that borough running to Astoria on the north and to Corona on the northeast. This action was taken in pursuance of resolutions adopted by the Board of Estimate and Apportionment, mentioned in this column last week, asking that the tunnel route be substituted for the original route over the Queensboro Bridge. The new route will be operated by the New York Municipal Railway Corporation in connection with the Broadway subway in Manhattan and the new lines in Queens, over which this company will have trackage rights. The Degnon Contracting Company proposed the change from the bridge to the tunnel and said it would submit a bid for its construction not to exceed $4,500,000, and that it would agree to complete the work within two and one-half years.

Snare & Triest have submitted the lowest bid of $611,563 for the station finish construction on sections No. 1 and No. 2 of the extension of the Queensboro subway from the Jamaica avenue to the Queensboro bridge Plaza.

PELHAM & HAVANA.—A survey has been made and construction work is to be started soon, it is said, on an extension to be built from Darsey, Fla., southwest to Havana, about five miles. The company now operates a line from Cairo, Ga., southwest to Darsey, Fla., 19.3 miles.

SCRANTON & BINGHAMTON (Electric).—This company, it is said, plans to build an extension to its lines from Foster, Pa., to Brooklyn, a distance of about five miles.

TENNESSEE RAILWAY.—An officer writes that a contract has been awarded to the Harriman Construction Company, Harriman, Tenn., for the construction of an extension of the main line from Oneida, Tenn., toward Petros, 8 miles, with branch lines 3 miles in length. When this line is completed, but 3 miles more will be needed to carry it to Petros. The main line will have a maximum grade of 1.4 per cent., and a 14 deg. maximum curve. On the branch lines the maximum grade will be 3 per cent. and the maximum curve 16 degrees. There will be a number of timber bridges. The road expects to carry a large amount of coal and timber. It will, in all probability, be built for the most part by convict labor. C. W. Butts, chief engineer, Oneida, Tenn. (July 9, p. 81.)

TROY RIVER FRONT COMPANY, INC.—A company by this name has been incorporated to build a short railroad along the river front at Troy, N. Y. The company expects to apply for a franchise at the next meeting of the common council. The Hudson Navigation Company, Pier 32, North River, New York, is interested.

RAILWAY STRUCTURES

ARGENTINE, KAN.—On July 19 a car repair shed of the Atchison, Topeka & Santa Fe was destroyed by fire. There were also 24 cars destroyed and 12 cars damaged. The total estimated loss will not exceed $50,000. The cause of the fire is unknown.

BUFFALO, N. Y.—The New York Central, it is reported, will build a reinforced concrete dock to cost $30,000 on the Buffalo river adjoining the dock of the Eastern Grain & Elevator Company.

CHEROKEE, IA.—The Illinois Central will build an 11-stall brick turntable pit roundhouse and several other buildings at this place to cost about $45,000. The contract has been awarded to Leyden-Ortseifen Company, Chicago.

DEERING, ILL.—The Chicago & Northwestern is taking figures on the rebuilding of the foundation of its three-track bascule bridge at this place.

EDDYSTONE, PA.—The Philadelphia & Reading has awarded the American Bridge Company a contract for fabricating and erecting a single track 67 feet single span through plate girder bridge over Eddystone avenue.

ISLAND CREEK, N. Y.—An officer write regarding the bridge to be built by the Delaware & Hudson over Island Creek, Albany county, N. Y., that plans are now before the Public Service Commission, Second district, but that these plans have not yet been passed upon.

KENSINGTON, ILL.—The Illinois Central has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for water facilities at this place. The work will include a pent stock, pipe lines, etc., and will cost about $8,000.

KEWANEE, ILL.—The Chicago, Burlington & Quincy will build a one-story brick, tile roof passenger station at this place. The contract has been awarded to Joseph E. Nelson & Sons, of Kewanee.

MACON, GA.—The Georgia, Southern & Florida has awarded a contract to the David Shaw Company, Macon, for the remodelling of the company's general offices on Fifth and Plum streets, at a cost of $10,000. J. A. Griffin, engineer, M. W. & S., Macon.

MCMINNVILLE, TENN.—The Nashville, Chattanooga & St. Louis, it is said, will build a bridge at this point. The bridge will be 100 feet long, and will have a 60-foot steel girder with concrete foundations and reinforced concrete approaches. There will also be a 4-foot sidewalk on each side. H. McDonald, chief engineer, Nashville, Tenn.

NEW YORK.—The Public Service Commissions of the first and second districts have issued a joint order requiring the elimination of grade crossings over the New York Central and the New York, New Haven & Hartford at 241st and 242nd streets in the Borough of the Bronx. The tracks are to be shifted and a viaduct constructed over them so that the full effect of recent grade crossing improvements at Mount Vernon will be enjoyed.

READING, PA.—The city engineer of Reading has approved plans of the Philadelphia & Reading for three concrete bridges to be erected at Center avenue, Fourth street and Schuylkill avenue, to cost about $75,000.

SAN ANTONIO, TEX.—The International & Great Northern has purchased 108 acres of land, 5 miles out of San Antonio, as a site for shops, yards and roundhouses. It is stated that approximately $500,000 will be expended. The plans for the buildings have been drawn and work will be started soon. O. H. Crittenden, chief engineer, Houston, Tex.

SPARTANBURG, S. C.—The Southern Railway has authorized the remodeling and enlargement of its passenger station at Spartanburg, S. C., and bids for the work are now being asked. The changes include the rearrangement of tracks, some paving, the construction of umbrella sheds, a passenger subway, and an underground waiting room and a bridge to carry Church street across the tracks. The extension of the station will be of brick, on a stone base. It will have a tile roof, and its architecture will conform to that of the present building. There will be separate waiting rooms for white and colored passengers, there being connected with each of these rooms a men's smoking room and a women's retiring room. There will also be lunch rooms for both white and colored persons, a ticket office, telephone office, baggage room and mail room. The contract for the passenger subway was awarded some time ago, as noted in the *Railway Age Gazette* of April 16, 1915, page 871, to M. M. Elkan, Macon, Ga., and R. B. Tufts, Norfolk, Va., and it is reported that these contractors have also been awarded the contract for the construction of the concrete bridge on Church street over the tracks.

UTICA, N. Y.—The New York, Ontario & Western on July 19 started construction work with company forces on a five-stall engine house on Pleasant street in this city. The structure will cost $12,500, and will be built of brick and concrete with a timber roof. J. H. Nuelle, chief engineer, Middletown, N. Y.

Railway Financial News

ARTESIAN BELT.—The contest over the control of this Texas road has resutled in the ousting of J. O. Terrell from the receivership by order of the Appellate Court at San Antonio. The railroad was built by the late Dr. F. C. Simmons, a patent medicine manufacturer of St. Louis, who owned a 250,000-acre ranch in the territory through which the line runs. Since the death of Dr. Simmons the road has been operated under the direction of the West Texas Bank and Trust Company, which is the executor of his estate. The appointment of Mr. Terrell as receiver was made recently by the district judge of McMullen county upon application of Boston stockholders. By the decision of the Appellate Court the property has again been placed in control of the West Texas Bank and Trust Company. The line extends from Macedonia, Texas, on the Sunset Central, south to Christine, 43 miles.

BOSTON & MAINE.—The Board of Directors on August 3 voted to join with the lines under lease to the road in an application to Governor Spaulding, of New Hampshire, for a special session of the Legislature of that State to consider a new bill for the reorganization of the Boston & Maine system.

CHICAGO & EASTERN ILLINOIS.—The following is the protective committee for the general consolidated and first mortgage 5 per cent. bonds: Harry Evans, chairman, president of the Continental Insurance Company; J. Howard Bagardus, secretary and treasurer of the Stamford Savings Bank of Stamford, Conn.; Herbert H. Dean, of Edward C. Smith & Co.; Samuel F. Streit, of H. T. Carey & Co., and Frank B. Weeks, of Middletown, Conn., ex-governor of Connecticut.

NEW YORK, NEW HAVEN & HARTFORD.—The attorney general complying with the order of the United States District Court, filed in court at New York, August 2, the bill of particulars asked for by the defendants in the suit of the government against 13 present and former directors of this road, charging conspiracy to monopolize interstate commerce. The document fills 63 printed pages, and is made up of 188 paragraphs. The most notable acts charged are those connected with the action of the directors of the railroad company in their management of steamboat lines on the Sound, and their alleged unreasonable acts in competition to drive out of business the Joy Steamship Company. Illegal acts are charged also in connection with the action of the Standard Oil Company and the Florida East Coast Railway in stifling steamship competition. The sending of steamships *Yale* and *Harvard* to the Pacific coast is declared to have been a part of the unlawful policy of the New Haven directors to monopolize water transportation in the East. Lewis Cass Ledyard, one of the directors, is charged with getting Mr. Mellen, in 1912, to write a letter deceiving the United States attorney.

The bill quotes a resolution said to have been adopted by the directors of the New Haven road April 17, 1913, which says:

"That no officer of the New Haven make any address or response to a toast or otherwise that shall in any way refer to the business of the company or its policies, or its prospects unless the same shall first have been submitted to and approved by the Executive Committee; that no officer give any information regarding the business of the company, its policies or prospects except through an authorized publicity department of the company provided for such purpose; direct interviews between officials of the company and representatives of the press being prohibited."

The bill states further that Director E. D. Robbins, before the return of the indictment under the Sherman law, cooperated with other directors in removing the books and records of the Billard Company to Canada and forming the "St. Lawrence Securities Company."

ROCK ISLAND COMPANY.—Vice Chancellor Emery, sitting in Newark on July 29, appointed Chauncey S. Parker, of Newark, receiver of the Rock Island Company.

[ADVERTISEMENT]

ANNUAL REPORT

BROOKLYN RAPID TRANSIT CO.

BROOKLYN, N. Y., July 27, 1915.

To the Stockholders of
The Brooklyn Rapid Transit Railway:

The passenger earnings of the system for the year ending June 30, 1915 (excluding for the purpose of this comparison the newly acquired Coney Island & Brooklyn Railroad Company's lines), failed for the first time in the history of the Brooklyn Rapid Transit Company to show a substantial increase over the passenger earnings of the preceding year, and instead there was a decrease. There were two main causes for this result:

First—The general depression in business and industry affecting Brooklyn as well as other portions of the country, reflected in a large number of men and women out of work and a tendency towards economy in expenditures.

Second—The very liberal increase in transfer facilities which went into effect on June 1, 1914, under order of the Public Service Commission, whereby the total number of transfer points on surface railroads in the system was increased from 721 to 1,008. The first year of operation under this order shows an increase of 10,552,274 transfer passengers carried, and a decrease of 2,141,700 cash passengers. This situation presented not merely a loss in revenue, but occasioned an increase in expense by reason of the increased service required for the transportation of the large number of additional transfer passengers.

The figures as given in the year's accounts, however, and as herewith reported, show an increase of $869,437.06 in passenger and other earnings, due to the inclusion of the operations of the Coney Island & Brooklyn Railroad Company for the entire fiscal year as against six months' operation of those lines during the preceding fiscal year. The increase in operating expenses was $965,828.71, of which $456,018.38 (nearly half) was due to charges to maintenance of way and structure and maintenance of equipment, and $267,551.52 to trainmen's wages.

Interest charges were reduced by the conversion of Refunding Bonds into stock, and were somewhat increased by rapid transit improvements placed in operation. The net result shows an increase of $196,856.26 in net income, and in addition the system's reserves for depreciation were credited with $256,384.55, as against a debit in the preceding year of $53,190.75.

Dividends at the rate of 6 per cent. were paid on the amount of capital stock outstanding during the year, namely, $74,520,000, leaving a surplus for the year over dividend requirements of $1,045,243.12.

A summary of the financial results is given in the following table:

COMPARATIVE STATEMENT OF THE RESULTS OF THE OPERATIONS OF THE BROOKLYN RAPID TRANSIT SYSTEM FOR YEARS ENDING JUNE 30, 1915 AND 1914.

	1915.	1914.		Increase or Decrease.
Gross Earnings from Operation	$26,427,686.66	$25,558,249.60	+	$869,437.06
Operating Expenses	14,960,381.37	13,994,552.66	+	965,828.71
Net Earnings from Operation	$11,467,305.29	$11,563,696.94	—	$96,391.65
Income from other sources	438,715.01	451,771.65	—	13,056.64
Total Income	$11,906,020.30	$12,015,468.59	—	$109,448.29
Less Taxes and Fixed Charges	6,393,459.18	6,699,763.73	—	306,304.55
Net Income	$5,512,561.12	$5,315,704.86	+	$196,856.26
Surplus at Beginning of Year	9,732,588.50	7,904,606.63	+	1,827,981.87
Coney Island & Brooklyn R.R. Co.'s Surplus at Time of Acquisition	.....	506,625.76	—	506,625.76
Total	$15,245,149.62	$13,726,937.25	+	$1,518,212.37
Other Credits to Surplus During Year:—				
Miscellenaous Items	4,131.20	30,653.36	—	26,522.16
Settlement of B'klyn City R. R. Co.'s Suit	.....	582,566.72	—	582,566.72
Sale of easement So. B'klyn R'y Co	.....	738,986.59	—	738,986.59
Total	$15,249,280.82	$15,079,143.92	+	$170,136.90
Of this amount there has been appropriated:				
Accounts written off	12,327.56	2,315.30	+	10,012.26
Adjustment of Taxes prior years	.....	10,801.78	—	10,801.78
Adjustment of Expenses prior years	35,088.74	*948.67	+	36,037.41
Supercession and Depreciation	45,062.12	174,339.01	—	129,276.89
Amount set aside as Reserve	.....	1,500,000.00	—	1,500,000.00
Loss from operation of Employees' Restaurants	9,445.97	.....	+	9,445.97
Loss from operation of Surface Cars over Man. Bridge	58,071.98	.....	+	58,071.98
Dividend on B. R. T. Co.'s Stock outstanding	4,467,318.00	3,660,048.00	+	807,270.00
Total Appropriations	4,627,314.37	5,346,555.42	—	719,241.05
Balance Sheet Surplus	$10,621,966.45	$9,732,588.50	+	$889,377.95

*Credit.

PROGRESS OF WORK ON RAPID TRANSIT LINES UNDER CONTRACTS WITH THE CITY.

Under the contracts of March 19, 1913, between the City of New York and the New York Municipal Railway Corporation (a constituent company of the Brooklyn Rapid Transit System), the city is to expend upward of $100,000,000 in the construction of rapid transit lines, and the Company is to expend in contribution toward the cost of such lines and in the equipment thereof, and in extensions, enlargements and reconstruction of existing rapid transit railroads, about $65,000,000. The contracts contemplated that all of these new lines, and the extension and reconstruction of existing lines, should be completed and ready for operation on the first day of January, 1917. More than half of this period has now elapsed, and it looks as if the most important part of the enlarged system would not be ready for operation until a considerably later date than January 1, 1917. The chief line, in the consideration of net revenue, is, of course, the Broadway-Manhattan Subway, with its connections to Queens and Brooklyn. Rapid progress has been made on those sections between Trinity Place and 26th Street, some of them being nearly completed, and all are at least three-quarters built. In the case of the other section, however, the contractor is not required to finish until some months after January 1, 1917, and the so-called Times Square section has not yet been let. The Board of Estimate has decided to make the connection with the Queens lines by a tunnel under the river instead of over the Queensborough Bridge, which will mean further delay, and in the case of the East River tunnel from the Battery to Brooklyn the contractor has until January 16, 1918, to complete. There is no way of operating the Broadway Subway, even as to those sections which may be completed on scheduled time, until connections are ready for operation between this line and either Brooklyn or Queens, for there is no other way of getting equipment into the subway. Obviously, it will not be desirable to postpone the operation of the Broadway Subway until the East River Tunnel from the Battery to Brooklyn is ready for operation, or until the connection is made to Queens either over the reconstructed Queensborough Bridge or through a tunnel, and the only hope of obtaining even a partial operation of the Broadway Subway is by the speedy completion of the connection on Canal Street with the Manhattan Bridge, and the contractor for this section has until March 16, 1917, for the performance of his contract. If this short section could be completed in advance of the time stipulated in the contract, that portion of the Broadway Line between lower Manhattan and probably 34th Street could be placed in operation shortly after January 1, 1917.

The prospect, however, is that a large part of the city's investment in the Broadway Subway (probably not less than $20,000,000) will remain idle, owing to the delay in letting contracts for certain sections, with the treble results of:

First, adding to the cost of construction by the interest on the idle investment;

Second, withholding from joint account the net revenue which would come from the operation of the line, and

Third, depriving the people of the improved means of transportation.

Moreover, no contract has yet been let for two comparatively short sections of subway which will connect the Brighton Beach Line with the Manhattan Bridge and Centre Street Loop—a simple extension of facilities which would be of great advantage to the six miles of tributary population between Prospect Park and Sheepshead Bay.

Nor has any contract been let for the 14th Street-Eastern Line, which will be of tremendous benefit to the people of the Eastern District of Brooklyn (now deprived of rapid transit). A portion of this route has not yet even been legalized.

The company, on the other hand, has proceeded as expeditiously as conditions would allow to carry out its obligations to the city. It will be remembered that the contracts made necessary the approval of the Public Service Commission to every detail of construction and equipment work performed by us, whether on our own lines or on those of the city. Every plan, every form of contract, every award of contract, and every dollar of expenditure are subject to the Commission's scrutiny, and must be approved by the Commission in advance. This arrangement makes for great delay, and in some cases the Commission has taken many months to consider contracts submitted to it which should have taken a few days or at the most a few weeks. Under these conditions our progress is necessarily slow, even in the extension and enlargement of our own facilities, and we cannot, of course, proceed with the equipment of the city-owned lines until they are substantially completed.

This entire situation involves serious consequences, both to the city and to the company, other than the substantial increase of costs which delay always occasions. At the time the contracts with the city were made it was the expectation of both parties, founded upon careful expert examination, that, while for a few years after initial operation the enlarged system which one of our companies is to operate would not earn full interest on both the city's and the company's investment, it would in a comparatively short time be self-supporting, and the city would then have added to its borrowing capacity upwards of one hundred millions of dollars, and in addition be the recipient of one-half of the divisible profits. That expectation was based upon the assumption that all the enlarged system would be placed in operation on or before January 1, 1917, whereas it looks now as if only the less profitable, or the unprofitable, new lines would then be in operation, and that the returns from the profitable lines would be indefinitely delayed. In the present financial condition of the city this result will mean not only that the city's credit will in the intervening period be too close to the debt limit to permit of expenditures for other municipal improvements, but that the taxpayers will be called upon for a longer period to make up more substantial deficits than were originally contemplated, and this at a time when taxes are a particularly heavy burden. It is true that by the terms of the contracts into which we have entered with the city, these deficits in meeting the city's interest during temporary operation are, contrary to all rules which apply to public service corporations generally throughout the country, chargeable to the city's construction account, but they must be paid by the city, either through direct taxation or through the issue of additional corporate stock not heretofore set aside for rapid transit purposes, and to the extent that additional corporate stock is issued for these deficits other municipal improvements must be postponed, or in some way not now discernible, the city's debt-making power must be expanded.

In the case of the company, while it is assured of its preferentials if earned, it must charge against earnings its new investment as put into operation, and if this investment is represented, as it will be very largely for the first few years, in construction and equipment work on lines which are the least hopeful as money-earners, its net income will diminish.

It is extremely essential, therefore, from the point of view of the city and its people, as well as for the interests of the company, that every effort be made to expedite the completion of all these new rapid transit

facilities, and the facts are stated and given emphasis in this report because of our very sincere conviction that neither public officials, taxpayers nor property owners sufficiently appreciate the present situation and its consequences.

The following is a synopsis of the progress of rapid transit work during the year so far as our relation to it is concerned:

Centre Street Loop.

The work of reconstruction of tracks and structures in Centre Street Loop, included in Modifying Agreement No. 2 with the city, was completed during the year, and equipment of all four tracks has been finished except a certain portion of the signaling. The additional tracks were placed in operation from time to time during the year. Additional power equipment was also installed in the temporary sub-station at Centre and Walker Streets.

Thirty-eighth Street Construction.

The work of construction in 38th Street, in the Borough of Brooklyn, included in Modifying Agreement No. 1 with the city, has been practically completed at Fourth Avenue and 38th Street; the remaining work between Fifth and Tenth Avenues is well under way and will be completed during the present calendar year.

Sea Beach Line.

The reconstruction of this line and the equipment thereof was completed during the present fiscal year, except station buildings, which will probably be finished before autumn. The tracks between Fourth and New Utrecht Avenues were completed by January 1, 1915, and between New Utrecht Avenue and 86th Street by May 1, 1915. That portion of the line between 86th Street and Coney Island has been equipped with third rail and temporary terminal facilities provided at Coney Island. Operation with new subway cars over this line was begun on June 1, 1915.

Fourth Avenue Subway.

The city completed during the year track laying in this subway, between the Manhattan Bridge and 65th Street, to an extent that permitted operation on two tracks, which was begun June 22d, connecting at 65th Street with the Sea Beach Line, and forming in this way a complete route from Chambers Street, Manhattan, to Coney Island, via Fourth Avenue and the Sea Beach Line. Tracks and equipment of the Fourth Avenue Subway are incomplete, and signal equipment has been installed on only a portion of the two tracks in operation. Connections, however, have been completed at 38th Street and Fourth Avenue to permit taking cars out of service for inspection.

Broadway-Myrtle Avenue Connection.

This connection was completed and operation thereover begun July 29, 1914.

Lutheran Cemetery Line.

The main portion of this line was finished and operation begun over the same on February 22, 1915. At the westerly end of this connection a temporary construction was provided pending the erection of new structure at Myrtle and Wyckoff Avenues, forming part of the third tracking of the Myrtle Avenue Line. Temporary arrangements have been made with reference to yard tracks at the east of this line pending the completion of the permanent yard.

Liberty Avenue Elevated Extension.

The steel structure of this line has been completed and track laying practically finished. Some work remains to be done on the station structures and it is expected that this line will be ready for operation some time during August or September of 1915.

Jamaica Avenue Elevated Extension.

Contract for the steel structure of Section I of this line was let in March, 1915, and contract requires completion thereof by February, 1916. Section I is about one-half of the total line, extending from Cypress Hills to Richmond Hill. Plans for the second section are awaiting a definite determination with reference to street lines, to be fixed by the city, which has also caused some delay to Section I.

Additional Tracks, Existing Lines.

The third tracking work on Fulton Street, from Sackman Street to Nostrand Avenue, has been practically completed so far as erection of structure is concerned. Contract for stations has been let, all of which will probably be completed before the end of the calendar year. The work on the lower section, from Nostrand Avenue to the Brooklyn Bridge, is awaiting the approval of plans by the Public Service Commission.

The third tracking work on Broadway, for that portion between Havemeyer Street and Myrtle Avenue, is well under way and will probably be completed by the end of this calendar year. Steel for the second section from Myrtle Avenue to East New York is being fabricated, a portion of which is being delivered.

Plans for the third tracking of the Myrtle Avenue Line were approved by the Public Service Commission within a few days, and bids for construction will soon be invited.

Car Equipment.

A total of 300 cars have been ordered, 160 of which have been delivered, 100 of the latter being now equipped and in operation.

Delivery of the remaining 140 cars will be made during the present calendar year.

Signal Equipment.

In addition to the signaling contracted for with reference to Centre Street Loop, contract has been closed which will cover signaling for practically all the rapid transit lines involved in contract with the city. This contract provides for immediate installation of signaling as construction work proceeds, and also provides for the contractor making certain experiments with a system of Cab Signal and Speed Control which, if satisfactory, will mark a great advance over signal methods heretofore in use.

Power Additions.

Numerous additions to power equipment were installed in existing substations, and two new sub-stations were constructed, one at 64th Street and Fourth Avenue, equipped with two 2,000 K. W. Rotary Converters, and one at Ozone Park, for the new Liberty Avenue Line, equipped with two 1,000 K. W. Rotary Converters.

New transmission lines were also installed.

EXPENDITURES UNDER CITY CONTRACTS.

The New York Municipal Railway Corporation's expenditures for construction and equipment to June 30, 1915, under the city contracts, were as follows:

On account of contribution to city-owned lines	$10,582,892.05
On account of equipment of city-owned lines	3,596,219.92
On account of additions, extensions, and improvements of existing railroads	15,831,747.81
Total	$30,010,859.78

RESULTS OF TEMPORARY OPERATION OF RAPID TRANSIT LINES UNDER CITY CONTRACTS.

The arrangement with the city, whereby the pooling of earnings between existing rapid transit lines with their extensions and the city-owned lines was to go into effect as new lines are added from time to time, was described in detail in the annual report for the preceding year. This temporary operation and pooling began on August 4, 1913, and the results for the year ending June 30, 1915, and for the entire period from August 4, 1913, to June 30, 1915, are given below:

RESULT OF OPERATIONS OF NEW YORK CONSOLIDATED RAILROAD COMPANY, LESSEE, UNDER THE PROVISIONS OF CONTRACT NO. 4, DATED MARCH 19, 1913, BETWEEN THE NEW YORK MUNICIPAL RAILWAY CORPORATION AND THE CITY OF NEW YORK.

	Year ending June 30, 1915	For the period Aug. 4, 1913 to June 30, 1915
Revenue:		
Passenger Revenue	$8,370,004.24	$16,023,760.08
Chartered Cars and Misc. Transp. Revenue	1,115.10	2,350.02
Advertising	63,966.66	129,815.83
Other Car and Station Privileges	46,056.73	96,282.15
Rent of Buildings and Other Property	27,266.70	53,752.78
Rent of Tracks and Terminals	44,515.98	77,666.63
Miscellaneous	7,631.19	7,919.62
	$8,560,556.60	$16,391,547.11
Deductions:		
Rentals	91,050.78	174,479.33
Taxes	525,189.87	1,060,243.28
Operating Exp., exclusive of Maintenance	3,396,054.00	6,456,997.02
Maintenance Fund	1,026,389.42	1,967,034.43
Depreciation Fund	256,597.32	491,758.56
Proportion of Company's Preferentials	3,591,000.92	6,786,447.66
	$8,886,282.31	$16,936,960.28
Deficit* in Company's Preferentials	325,725.71	545,413.17
Interest† Paid by City on Its Cost of Construction of Property Placed in Operation Plus Sinking Fund at Rate of 1 Per Cent per Annum	404,661.45	714,721.93
Total Deficit	730,387.16	1,260,135.10

*To be made good from future net income before payment of city's interest and Sinking Fund charges.

†Deficits in city's charges during temporary operations to be added to the cost of construction of city-owned lines.

ADDITIONS, IMPROVEMENTS AND MAINTENANCE.

Exclusive of expenditures on rapid transit lines under contracts with the City of New York (referred to above) there was expended for additions, chargeable to Capital Account, $1,133,446.06, which are classified in detail in Table No. 3 attached.

The charges for maintenance of way and structure and of equipment were $4,793,655.73, being an increase over similar charges for the preceding year of $456,018.38, and exceeding the charges of any year in the history of the system. The actual expenditures were less than the charges by $256,384.55, which amount was credited to Reserves.

Among the principal maintenance and construction expenditures during the fiscal year (other than construction expenditures on rapid transit lines referred to above) are the following:

Track and Structure.

On the surface lines 83,930 feet of single track were relaid with standard 7-inch 105-lb. rail, and 96,072 feet of single track were overhauled; 154 pieces of special work were installed, repaired or renewed; 145,797 square yards of improved granite block pavement on concrete foundation were laid, and 781 square yards of wood block pavement, in addition to which the city laid at the expense of our companies 45,383 square yards of improved pavement.

A double track line consisting of 5,921 lineal feet of "T" rail construction was built in Stillwell Avenue from the West End Line, near Avenue "R" to a connection with existing tracks in Stillwell Avenue, north of New York & Coney Island Railroad.

On Hegeman Avenue, between Hopkinson and Rockaway Avenues, a double track line, comprising 1,578 lineal feet of track, was laid with 7-inch girder rail.

On New Lots Road, between Williams and New Jersey Avenues, 2,363 square yards of recut granite were installed.

The special work lay-out on Prospect Park Plaza at Ninth Avenue and Fifteenth Street was renewed, with extensive changes in alignment, etc., to accommodate the plans of the Park Department for improvement of the Plaza.

Many riveted joints of surface tracks were replaced by seam-welding process.

On the elevated lines renewals were made as follows:

51,658 lineal feet of rail,
1,425 lineal feet of steel guard rails,
35 switches,
28 frogs,
4 crossings,
16,789 ties,
39,630 lineal feet of timber guard rail, and
140,508 lineal feet of 2x6-foot walk.
22,593 lineal feet of elevated structure were repainted.

All elevated stations between St. Marks Avenue and 65th Street were given a general repair and repainting; similar work, although not so extensive, was done on the stations on the Lexington Avenue Line from Greene Avenue to Reid Avenue, on the Myrtle Avenue Line from John-

son Street to Knickerbocker Avenue, and the Broadway Line from Van Sicklen Avenue to Crescent Street.

BUILDINGS.

An extension of the shop building was constructed at Fresh Pond Road; an enlarged and improved school room for the instruction of motormen and conductors was provided in the 58th Street Car Barn, and various improvements and repairs have been made to many buildings.

POWER STATIONS AND TRANSMISSION LINES.

At Williamsburg Power Station a cinder catcher was installed in the flues for eighteen boilers located on the first floor; six underfeed stokers with their blowers and coal-handling equipment were installed, and the intake well of tunnel for condensing water was rebuilt.

At Central Power Station seven oil switch compartments were constructed, and additional switchboard and switching equipment installed for the operation of the Fourth Avenue Subway.

At Tompkins Sub-station one 3,000 K. W. Rotary Converter with its transformers, switchboard equipment and storage battery was installed, making the present capacity of the station 8,000 K. W.

At Hudson Sub-station two 2,000 K. W. Rotary Converters with their transformers and switchboard equipment were removed, and replaced with two rotaries of 4,000 K. W., making the present capacity of the station 14,000 K. W. The Rotary Converters removed were installed in the 64th Street Sub-station of the New York Municipal Railway Corporation.

The Sanford Street Sub-station of the Coney Island & Brooklyn Railroad Company, having been shut down, was dismantled and the equipment removed to Ozone Park Sub-station.

At Coney Island Sub-station one 2,000 K. W. Rotary Converter with its transformers, switchboard equipment and storage battery was installed, making the present capacity of the station 6,000 K. W.

There were removed from the system 17.91 miles of overhead D. C. feeders, and 8.95 miles of this were reinstalled in other parts of the system.

Connections were made between the high-tension cables and the conduit lines of the Coney Island & Brooklyn Railroad Company and other companies of the system, which permitted the removal from the conduit line of the Coney Island & Brooklyn Railroad Company of one 3/0 high-tension cable 14,850 feet in length. This cable was reinstalled between the Essex Sub-station and the Ozone Park Sub-station for the operation of the Liberty Avenue Extension.

High-tension cables were installed as follows:

One 350,000 C. M. Sector Cable between the Williamsburg Power Station and the Essex Sub-station—28,650 feet.

Three 350,000 C. M. Sector Cables between the Williamsburg Power Station and the Hudson Sub-station—31,026 feet.

One 350,000 C. M. Sector Cable between the Williamsburg Power Station and the Richmond Hill Sub-station—47,473 feet.

16.40 miles of underground feeders were removed, and 15.51 miles reinstalled in other parts of the system.

80.44 miles of trolley wire were renewed.

Telephone wire to the extent of 4.93 miles was removed.

2,524 trolley poles were repainted, 136 reinforced, 649 reset, 386 installed, and 297 removed.

2.15 miles of conduit lines were constructed.

EQUIPMENT.

462 complete air-brake equipments were installed on surface cars.

300 partial air-brake equipments were installed on surface double truck open passenger cars.

200 partial air-brake equipments—semi-automatic features substituted for straight air features—were installed.

617 improved geared hand brakes, supplementing air brakes, were installed.

112 pairs of new trucks have replaced a like number of old style inferior frames.

559 pairs of improved design maximum traction truck frames were installed under cars which are being equipped with air brakes.

On the surface division 21 single truck closed passenger cars, 201 double truck closed passenger cars, 509 semi-convertible cars, 250 double truck open cars, 432 convertible cars and 22 center-entrance cars were repaired and revarnished.

Of the Coney Island & Brooklyn equipment 90 double truck closed cars and 86 double truck open cars were overhauled and repainted.

83 plows and sweepers were repaired.

73 service and freight cars and 945 damaged passengers cars were repaired.

300 pairs trucks were overhauled and strengthened to operate under open cars equipped with air brakes.

541 cars were equipped with wheel guard chains.

In 107 semi-convertible cars longitudinal seats were substituted for Chamberlin chairs.

On the elevated division 31 cars have been repaired and repainted and additional circuit of five lights installed; 594 motor and trailer passenger cars have been repaired and revarnished; and 85 damaged passenger cars and 70 service and freight cars have been repaired.

At all machine shops machinery has been safeguarded to avoid accidents, and various additional tools have been installed.

EMPLOYES' WELFARE WORK.

The broad program of employes' welfare, which has been under development for many years, was substantially added to during the last year. The Employes' Benefit Association, through which these activities are largely conducted, has now a membership of upwards of 8,000, of whom over 6,500 are in the operating branches, while about 1,500 are in other departments of the system.

We expended during the past year, in the maintenance and improvement of the club rooms for employes, in support of the Pension System, in medical inspection service, and in sickness and death gratuities in cases not reached by the Employes' Benefit Association, the sum of $78,742.47.

The organization of a Brooklyn Rapid Transit Baseball League in the summer of 1914 was a distinct and very popular addition to the social diversions of the employes. The company provided all equipment, including uniforms, hired umpires and paid the ground expenses. A field day, under the auspices of the Baseball League, was attended by more than 5,000 employes and members of their families.

The system of compulsory medical inspection and free attendance for employes excused on account of illness, which was established January 1, 1913, for approximately 10,000 men in the operating department, accomplished during the past year a reduction in the amount of time lost by the operating employes on account of sickness of 13,485 days (or nearly 18 per cent) over the time lost in the year ended June 30, 1914. The milder winter of 1915 accounted for about 7,000 days of the total reduction. Making due allowance for this, however, there still remains a saving of upwards of 6,000 days' work for the year, or a reduction of 8.6 per cent over the sickness record of the year ended June 30, 1914.

The system of compulsory medical inspection was accompanied in its first year by a reduction of 24 per cent in the number of days' work lost by operating employes on account of illness, and it is gratifying to find that this initial record is still being improved upon as the activities of the Medical Inspection Bureau develop. These activies embrace not only the inspection and attendance of operating department employes reporting sick, but free medical attendance for members of the Employes' Benefit Association outside of the operating department; the care of all employes injured in the performance of their duties and entitled to medical attendance under the Compensation Act; the examination of candidates for employment and the periodic re-examination of all motormen.

A system of First Aid to the Injured has been developed to a high state of efficiency. An improved portable First Aid case with equipment for use both by an instructed layman and by a physician has been developed by the physicians of the Medical Inspection Bureau; 68 of these cases have been installed in the depots, terminals, shops and power houses of the company, and supplied to emergency and other crews required to work out on the lines. Wherever a First Aid case has been installed, a sufficient number of employes have been instructed in approved methods of First Aid to insure the presence of some qualified individual at all hours of the day or night when work is going on.

This system of First Aid to the Injured will have an important influence in minimizing the effects of injuries received by employes, particularly as it insures not only the prompt administration of First Aid, but the prompt reporting and treatment of all cases by the physicians of the Medical Inspection Bureau.

SAFETY CAMPAIGN.

On July 2, 1914, there was appointed a Central Safety Committee representing all the departments of the company in which the accident hazard is a material factor. In accordance with a plan of safety organization at that time adopted, each department set up a departmental safety organization, having as its objective the stimulation of a greater interest on the part of all employes in the problem of safety, through active participation in the study of conditions which produce accidents and in the devising of remedial measures.

The company invited all employes to report dangerous conditions and to make suggestions in the interest of safety. Meetings were held, both of committees and of departments generally, for the purpose of discussing the safety problem. So far as practicable, the investigation of accidents actually occurring was referred to the safety committees comprised largely of the rank and file. The employes demonstrated an immediate and vital interest in the safety movement, which was most encouraging. The various departmental organizations were completed during the fall of 1914. Although the period is too short to justify any general conclusions, it is at least gratifying to note that in each of the last six months boarding and alighting accidents, car collisions, accidents in which cars strike persons, and car vehicle collisions, have made a more favorable showing than in any one of the corresponding months of the previous year—and this in spite of the fact that the hazard of accident has been increased substantially by the reconstruction of several of the elevated lines and the construction of new lines, with operation over the same routes proceeding uninterruptedly during the progress of the work.

The public safety campaign, conducted in co-operation with the Brooklyn Institution for Safety, was continued in the schools of Brooklyn throughout the year, with the approval of the Board of Education of the City of New York. Stereopticon and moving picture lectures were featured in the school instruction; Safety Patrols among the boys, and Careful Clubs among the girls, were organized. Safety calendars, bearing an appropriate drawing and text for each month, were supplied in the number of 9,000 for every school class-room in Brooklyn; 234,000 safety stories were distributed to the school children, together with 415,000 safety buttons.

This educational work covered 159 public schools of grammar grades and below, 14 high schools, and 54 parochial schools. Sixty-eight prize competitions in essays on safety were held. In addition to the work in the schools, 104 safety lectures were delivered to adult audiences, reaching approximately 38,000 people. The attendance at lectures or moving picture performances given primarily for children, including children who may have attended more than one performance, was approximately 340,000.

During the summer of 1914, safety instruction was given in 53 playgrounds and nine summer schools in Brooklyn, and 43 motion picture performances featuring safety were given in the parks. Provision has been made for continuing safety instruction in the playgrounds throughout the present summer.

As in the previous year, the results of the safety work done in Brooklyn have been made available to public organizations and corporations engaged in similar work throughout the country, and substantial evidences of appreciation have been received from many quarters.

ACCIDENTS AND NEGLIGENCE ACTIONS.

The amount paid during the fiscal year for injuries to passengers and property aggregated $607,700.61, or an increase of $63,815.48. The legal expense in connection with damages was $261,153.68, an increase of $41,394.95. The total payments for damages, including legal expense, were 3.29 per cent of earnings. Of course, these payments represent accidents not only during the current fiscal year, but prior thereto. As a matter of fact, there were 1,333 fewer accidents on the system during the fiscal year than during the preceding year, and 139 fewer actions were brought against the companies. The number of accidents tried in the courts, however, showed an increased of 42 per cent over those tried in the preceding year.

Based upon awards approved by the State Workmen's Compensation Commission we have established reserves adequate to meet future obligations to the dependents of deceased employes.

FIRE INSURANCE.

In the year 1913 the New York Fire Insurance Exchange increased very largely the rates on the system's properties, and this action compelled the companies of the system to place their risks with London Lloyds, where a much lower rate was obtainable. In the succeeding year, however, the local Exchange offered an average rate somewhat lower than Lloyds, and about 20 points lower than the rates fixed in the preceding year, and our insurance was therefore placed with domestic companies for three years under blanket schedule. The average rate as fixed was .25387, which was afterwards reduced by reason of certain improvements made in the risks to .23358. The subsequent inclusion of the Coney Island & Brooklyn Railroad Company's properties may increase this rate slightly. Notwithstanding these low rates the companies of the system are continuing to accumulate an Insurance Reserve Fund, which, on June 30, 1915, had reached the sum of $787,439.47, an increase of $188,242.28 during the year. This fund, to the extent of $736,011.20, is invested in stable securities.

CAR AND STATION ADVERTISING.

Contracts with the Inter-City Car Advertising Company having expired on April 30, 1915, and not being renewed, it was decided to under-

take this branch of business independently, and there was organized the Broadway Subway and Home Boroughs Car Advertising Company, with a capital stock of $10,000, all of which is owned by the Brooklyn Rapid Transit Company. This advertising company, under the direction of Joseph P. Day, the well-known real estate man, as president, will conduct the car and station advertising and news and vending privileges for the various railroads of the system.

FREIGHT TRAFFIC.

During the fiscal year the freight department shows a gross revenue of $625,769.97, an increase over the preceding year of $128,200.81. The net revenue was $287,355.64.

A small increase in the arbitraries allowed by the trunk lines has been obtained through the 5 per cent increase in rates authorized by the Interstate Commerce Commission.

The volume of freight has been considerably increased through the construction and excavation work incidental to the building of rapid transit lines.

The facilities of the freight department have been used by the contractors for practically all sections of the new rapid transit lines. Such transportation has not only been a convenience to the contractors, but has proved cheaper than other means of transportation, thereby lessening the contractors' cost and incidentally the cost of construction, has permitted the handling of material in much larger quantities and in less time, and has expedited the completion of the work.

There is a constant demand from manufacturers and commercial houses for side track connections in order to obtain deliveries of freight through the trolley or steam car deliveries over our lines.

INCREASE IN NUMBER OF STOCKHOLDERS.

The number of stockholders has increased by 2,514 during the fiscal year—the total number on June 9, 1915, being 8,833.

RESERVE ACCOUNTS.

There has been added to Reserves during the year the following:

Insurance	$188,242.28
Amortization of Capital	256,384.55
Employers' Liability	34,995.85
	$479,622.68
but retired property adjustments chargeable to these Reserves—aggregating	$390,217.37
have reduced the year's gain in Reserves to	$89,405.31

BROOKLYN RAPID TRANSIT REFUNDING MORTGAGE FOUR PER CENT. BONDS.

Authenticated to July 1, 1914	$51,792,000.00
Authenticated during year	3,269,000.00
	$55,061,000.00
Converted into stock	29,619,000.00
Net Authenticated and Outstanding	$25,442,000.00
In Hands of the Public	$3,459,000.00
In Possession of the B. R. T. System	21,983,000.00

As follows:

*Collateral to $40,000,000.00 6 yr. 5 per cent. Notes	$10,000,000.00
Collateral to Bills Payable	4,876,000.00
In Treasury B. R. T.	5,096,000.00
In Treasury N. E. R. R.	1,046,000.00
Deposited with City of New York by The N. E. R. R. Co.	15,000.00
Deposited with Trustee of The Nassau Electric Railroad Consolidated Mortgage.	700,000.00
Guaranty Fund Brooklyn City Railroad Lease	250,000.00
	$21,983,000.00

Detailed statements of operation, statistics and consolidated balance sheet are appended hereto.

Respectfully submitted by order of the Board of Directors,

T. S. Williams,
President.

*$301,000 par value of these notes have been converted into New York Municipal Railway Corporation's five per cent. first mortgage bonds, as permitted, prior to January 1, 1916, by the terms of the trust agreement.